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The first water-related gathering convened by the D-8 (Developing Eight) countries in İstanbul

The Developing 8 (D-8), including Turkey, was founded in İstanbul on 5 June 1997. Being a group that was established to develop economic and trade cooperation among the member countries, D-8 consists of Iran, Egypt, Bangladesh, Malaysia, Indonesia, Nigeria, Pakistan, and Turkey. The D-8 countries maintain their cooperation on sectoral basis. The main areas of cooperation among the aforesaid countries might be listed as follows: Turkey in the field of industry, health and environment; Bangladesh in rural development; Indonesia in fight against poverty and in human resources; Iran in science and technology; Malaysia in finance, banking and privatization; Egypt in trade; Nigeria in energy; and Pakistan in agriculture and fishing.

On 21-22 February 2013, D8 countries came together in İstanbul for the first time to exchange information and cooperate on water. As the meeting, organized by SUEN (Turkish Water Institute) for two days, was held in three parallel sessions; the participants were composed of high-ranking bureaucrats from relative government agencies of member countries. Delegates attended the three parallel sessions, under the title of Water Management Technical Meeting; Meteorological Service Technical Meeting; and Agriculture, Energy and Hydraulic Works Technical Meeting.

The fact that water-related problems started to be observed more frequently in literature especially as from 1990s drew more attention to the importance of subject. Particularly in semi-arid/arid climate zones in the world have been suffering noticeable water shortage. The water shortage is not only observed in terms of quantity. It is also observed in terms of quality and as a technical shortage. While cooperation water-related problems among countries are suggested as a solution, and 2013 was declared as the United Nations (UN) International Year of Water Cooperation. Concordantly, D-8 countries convened a water cooperation meeting.

During the two-day long meeting, each member state informed about their own water resources management, water-related data and how it is obtained, water structures and irrigation. During the meeting where water-food-energy nexus, which has been a central concern for the world especially for two years, was talked about; the delegates also discussed non-conventional methods such as desalination and re-use of waste water, in addition to renewable water resources.

During the Agriculture, Energy and Hydraulic Works Technical Meeting, where particularly Egypt, Iran and Turkey also participated in, it was mentioned that agricultural water use of the three aforesaid countries that are located in semi-arid/arid climate zone is more than 70% compared to other sectors. In these countries, where evaporation rate is very high, implementation of wrong irrigation techniques leads to salination in soil and desertification. Therefore, these three countries focus on productive use of water especially by using modern irrigation techniques. Other issues that should be brought up to the agenda and require cooperation within the framework this session are listed as follows: Re-use of waste water; raising awareness and providing training about use of water;



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water and energy; developing management strategies for efficient use of water; impacts of climate change on water resources; desalination; rain water management; and water governance.

Three delegates group coming together at the end of two days gathered outputs of the meeting to prepare a joint report. According to these outputs; D-8 countries should provide a reliable and sustainable water management through cooperation. To that end, assessing capacities on cooperation of member states; developing capacity; forming a legal frame for integrated water resources management, water quality management, mutual training programs and joint projects; establishing information network among members; including partners in administration; including private sector in research areas; and political intentions of member countries on cooperation constitute major cornerstones. In addition, it was suggested to form an executive committee, to assign a secretariat, and to convene a meeting at least once a year.

This meeting is the first and a major step that the D-8 countries took for cooperation on water. Establishing a committee and secretariat also indicate that there is an effort to form an institutional structure. The D-8 countries are expected to be helpful for each member state through cooperation on improvement and management of water resources, experience sharing, and technical support.

"The first water-related gathering convened by the D-8 (Developing Eight) countries in İstanbul", Tuğba Evrim Maden, ORSAM, 26/02/2013, online at: <u>http://www.orsam.org.tr/en/WaterResources/showAnalysisAgenda.aspx?ID=2153</u>

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Construction of Disputed Turkish Dam Continues

ILISU, <u>TURKEY</u> — Mahmut Dundar raised a remote control toward a flat-screen monitor suspended from the ceiling of his office beside the Tigris River in southeast Turkey.

"These are live," he said, as he toggled between images of men and machines swarming over a dozen different building sites of the Ilisu Dam project.

The feed goes to the prime minister's office in Ankara, Mr. Dundar, general manager of the project, said last week. "The prime minister can watch every point of construction 24 hours a day, minute by minute, so he is informed of our progress at all times. He has set the target for completion for 2014, and we mean to make that date."

About 1,450 workers are laboring around the clock to complete the Ilisu Dam, one of the most controversial public works projects in recent history, by the middle of next year. That would be exactly five years after European lenders pulled out of the €1.1 billion, or \$1.5 billion, project in July 2009, citing concerns about environmental impact, resettlement policies and the destruction of cultural treasures. Undeterred, Ankara quickly raised domestic financing and resumed work in 2010.

"We have now completed 53 percent of the project, and we will complete the rest on time," said Mr. Dundar, who is also regional director of the state hydraulic works. "We have no funding problems whatsoever, we work day and night, and all relevant agencies are in constant coordination."

On the construction site, about 40 kilometers, or 25 miles, from the Syrian border and 70 kilometers from Iraq, the roar of machinery drowned out the rushing waters of the Tigris, which has been diverted from its natural bed to flow through three diversion tunnels and emerge roiling and foaming into a new concrete basin.

The surrounding mountain ridges bristled with military sentry posts and surveillance equipment guarding the construction site against the Kurdish rebels roaming the area.

Trucks and earth movers hauled loads of limestone, basalt and clay onto the rising body of the dam, which is to attain a height of 141 meters, or 460 feet, when complete. The crest of the dam will be 2.3 kilometers long, with a volume of 24 million cubic meters of earth and rock.

One-third of that is done, Mr. Dundar said, with the rest scheduled to be finished within the year. "Meanwhile, construction of the spillway and the power plant are going ahead according to plan," he added.



If the project stays on track, the Ilisu Dam will begin to impound water next year. Filling the reservoir could take anywhere from 5 to 11 months, Mr. Dundar said, depending on the season in which it is begun. "We think the reservoir will be filled in 2015," he added.

The project appeared to hit a snag last month when Turkey's highest administrative court ruled that a decree issued by Prime Minister <u>Recep Tayyip Erdogan</u> last year to accelerate work on the dam was in part null and void.

The court declared invalid that part of the decree that declared all infrastructure projects connected to the dam to be exempt from environmental impact assessment requirements on the grounds that plans for the dam were drawn up before the relevant law came into effect in 1993. Opponents of the project were jubilant and staged a rally in Ankara, calling for the Ilisu construction site to be shut down.

Emre Baturay Altinok, the lawyer who lodged the complaint on behalf of environmentalists, said by telephone from Ankara this month: "It is unlawful to continue work on the project without environmental impact assessments. The construction site must be closed and sealed."

Mr. Dundar disagreed with that interpretation of the ruling, which he said would not impede work on the dam.

"The ruling does not even remotely have anything to do with stopping the project," he said. "It is merely about applying the environmental impact assessment regulations, which we are now doing anyway."

The state hydraulic works authority has lodged an objection to the ruling, asking for clarification of certain terms, he said. "But in any case," he added, "the final judgment will definitely not stop the project."

Mr. Altinok, the lawyer, said he was not surprised that construction was continuing six weeks after the court ruling. "That is the way of justice in Turkey," he said. "We are accustomed to court rulings against large projects not being implemented."

The Ilisu project has long inflamed passions in Turkey and beyond. Concerns about its environmental, cultural and social impact forced companies and financial backers from Germany, Austria and Switzerland to pull out of the project under pressure from public campaigns in 2009.

With a capacity of 11 billion cubic meters of water, the Ilisu reservoir will flood more than 30,000 hectares of land, or 74,000 acres, submerging parts of the historical town of Hasankeyf upstream, as well as uncharted archaeological sites along the Tigris. The waters will displace 199 settlements,



affecting 55,000 people, according to a report drawn up in 2008 by international experts acting on behalf of European export-credit agencies.

Scientists are at work in Hasankeyf to prepare for the removal of cultural monuments to a safe location across the Tigris and to fortify higher parts of the ancient town that will not be submerged, Mr. Dundar said.

A new town on a mountainside across the river from Hasankeyf is nearing completion and should be ready for resettlement of the town's population before the water begins to rise.

Resettlement has been completed in the village of Ilisu near the dam site, where villagers were moved to a new settlement at the end of 2010.

Villagers interviewed in Ilisu this month were unenthusiastic about their new homes, despite the running water in modern kitchens and bathrooms and communal amenities such as a playground and a meeting room.

"It was better in our old village," a woman who gave her name as Zekine said. "Our fields and orchards were there. They are all gone now."

Many villagers complained about the loss of their farmland. "Most people here work on the dam construction site now, but once that wraps up, there will be no place to work," said Mehmet, a young man who did not give his family name. "I preferred our old village, because we had our orchards and our vines and could always make a living if we worked hard."

"We were farmers, now we are workers," said Osman Demir, from the neighboring village of Karabayir, whose agricultural land was nationalized to build the new village of Ilisu.

Like most settlements affected by the dam, his village has not applied for resettlement by the state.

Besides Ilisu and Hasankeyf, only one other village has signed up for resettlement, Mr. Dundar confirmed. "It is up to the free will and democratic wishes of the villagers," he said. "We want to build modern settlements for them. But we can only do it for those who want it."

This is what opponents of the dam have feared all along, said Arif Arslan, president of the Friends of Hasankeyf Association in Batman, who has been monitoring the Ilisu project for 20 years.



"It will be just like when the Batman dam was built and 20,000 villagers were displaced" in the 1990s, Mr. Arslan said in a recent interview. "Villagers will move to the city with their cash compensations, the money will run out, and they will end up leading miserable lives in the slums."

Mr. Arslan is skeptical that the Ilisu project will contribute to the welfare and development of the region, among the poorest in Turkey. "We have seen 18 dams built in this region already," he said. "Do you see a rise in the standard of living anywhere around here?"

In Ilisu, Mr. Dundar said that "every project has unwanted side effects." Yet the Ilisu Dam is essential to the development of the country and the welfare of its people, he argued. "Our country needs energy, and we are trying to meet that need," he said.

Ilisu's 1,200-megawatt <u>hydroelectric</u> power plant is designed to produce nearly 4 billion kilowatt hours of energy per year, worth an annual \$400 million, according to project managers.

"Our country's weakest spot is its dependency on energy imports," Finance Minister Mehmet Simsek said at the opening of Ilisu's diversion tunnels last year. To partly overcome that dependency, he added, "This jumbo project is of the utmost strategic and economic importance to our country."

"Construction of Disputed Turkish Dam Continues", 27/02/2013, online at:

http://www.nytimes.com/2013/02/28/world/middleeast/construction-of-disputed-turkish-damcontinues.html?pagewanted=all& r=1&utm_medium=twitter&utm_campaign=Feed%3A+blogspot%2FPDbq+(Elder+of

+Ziyon)&

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* KRG: Agriculture Taking Second Place to Oil Development

KRG: This region of northern Iraq was once considered the breadbasket of Mesopotamia, if not a good part of the sandy Middle East. But for a variety of negative reasons - though the Region boast a large amount of arable and fertile land - agriculture has been a less than productive sector for several decades, first because of the decimation suffered during the Saddam Hussein regime and now because of the more lucrative business of oil and real estate. But investing in the agriculture sector is of continuing interest to the KRG, for reasons practical – becoming food self-sufficient- and also for reasons historical and cultural.

In a recent interview with MarcoPolis.net, Kurdistan Prime Minister Nechirvan Barzani noted that achieving self-sufficiency was "a key priority for our government." Barzani added that while the autonomous Region had markedly enlarged the oil & gas industry to the point of exporting up to 250,000 bpd, work remained in rebuilding the agricultural sector. "Our Region used to be very rich in agricultural products; in fact it was more often referred to as the food basket for the country. Today, the Region imports most of its produce despite the fact that there are local produce available; our Region still lacks the experience and expertise about taking these products to the market," Prime Minster Barzani said. "Over the next several years, our government will be supporting measures to attract much-needed attention and investment to these areas."

The fertile river valleys and plains of this Region played host to some of the first known agriculture, with farming and animal husbandry having been dated back to around 7,000 years ago. Because of the destruction of many of the farming village by the troops of Saddam Hussein and the current emphasis on other economic sectors, what was once the breadbasket of Iraq has now become a "rentier" economy with the autonomous Kurdistan Region using its large cash supply from the oil economy for net imports of the majority of its food products from neighboring Turkey and Iran. According to Turkish officials, Kurdistan imported about USD 7 billion in goods last year, most of which was food. Iran exports a large amount of livestock to Kurdistan. Because the sector is starting from a low baseline, some investment advisors make the salient argument that the sector can only go up: "...we have good agriculture that could be developed and we have had now almost 30 or 35 years of zero development. Thus, we are starting from a low base," said Shwan Ibrahim Taha, Chairman of Rabee Securities. "Many investors, who come to Iraq and look at Iraq, ask me 'what shall we invest



in, in Iraq?' and I say 'there's a long answer to that question because you can invest in everything,' the better question would be: what should I not invest in?"

Jamal Baban, an ethnic Kurd and longtime UN agriculture expert who also served as the Minister of Agriculture to the Sulaymaniyah governorate, noted in an interview with Rudaw.Net, "The agricultural sector in Kurdistan is dilapidated because of Iran-Iraq war, the genocidal Anfal campaign, the chemical bombardment and the evacuation of villages... Also, rising inflation, economic embargos and the oil-for-food program destroyed the agriculture sector even more. If the wars and evacuation of villages weakened agriculture, then the UN oil-for-food program killed it." While Baban was Agriculture Minister in the Sulaymaniyah governorate he was unsuccessful stopping two large residential projects slated for developing former agricultural land, which has been a pattern throughout the Region. "When I was minister, I issued a decree to stop the expansion of Halabjay Taza district so that agricultural land would no longer be taken because you can't let one of the most fertile plains in Kurdistan - such as Sharazour Plain - to be turned into a residential area," Baban told Rudaw.net. "It didn't succeed and wasn't even talked about afterward." He added that the same happened to his attempted preservation efforts in the Piramagroon district.

A small detail perhaps, but metaphorically important, is that Financial Times reporter Simeon Kerr recounted in an article about food security in Kurdistand how "the collapse of domestic produce is apparent when looking for Erbil's renowned white sheep's cheese, a Kurdish produce once prized across Iraq. While Turkish manufactured produce and Iranian vegetables are plentiful, only a few stores sell the pungent delicacy in Erbil's covered souk." The above challenges noted, the KRG Ministry of Agriculture and Water Resources is pushing toward the goal of food self-sufficiency, one step at a time.

According to Herish Muharam, Chairman of the Kurdistan Board of Investment, the policy going forward is that the KRG will give more lucrative incentives to the agriculture sector, besides the other priority sectors of industry and tourism. "Incentives will not be given out equally to all sectors. We would be giving higher incentives to some more prioritized sectors and less to other sectors or in some cases no incentives at all, because competition has been very high so we need to slow down and give fewer incentives to certain sectors."



The Ministry of Agriculture and Water Resources issued a directive in October giving back various parcels of agricultural land to their previous Kurdish owners opening the way for owners to resettle lands that had been occupied for more than 30 years. The KRG will also provide subsidies to those farmers receiving land back.

Starting in 1981, the Hussein regime launched a land-seizing campaign as part of an "Arabization" of various areas. Under a decree from Baghdad, land was taken under threat of force from Kurds who held legal ownership documents. The compensation was only 15 Iraqi dinars per acre of rain-fed land and only 30 dinars for irrigated farmsteads, leaving the previous owners with very little even for the exchange rates at that time.

During the World Kurdish conference in October 2012 in Erbil, Serwan Baban, Minister of Agriculture and Water Resources for the KRG gave some of the following figures for current food production and the goals the ministry was setting for increase of various commodities. According to the minister, the production of oat, corn, sunflower, red meat, milk, tomatoes, grapes, apples and other fruits in 2011 was less than 50 percent of the amount required for self-suffiency. He added that for 2013 the ministry projects the production of up 40,000 tons of red meat – double the 2011 figure – and 150,000 tons of oats – also double – along with a marked increase in the amount of egg production.

Baban added that only 30 percent of the fruit needed for self-sufficiency will be reached by 2013 while vegetable production will achieve 80 percent of self-sufficiency in 2013. The ministry will facilitate support for Kurdish farmers and increased production by the use of "new methods and technology, the improvement of farm equipment, the introduction of transport subsidy, modern machinery and training in contemporary agricultural methods and techniques as well as health and safety issues".

Perhaps more controversial, the KRG may ban certain categories of imports as those commodities reach near self-sufficiency in Kurdistan, with the view that such bans will help protect local growers.



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In many ways, most of these measures mirror those used for other sectors by trying to attract FDI and technologically advanced foreign companies in order to quickly develop the respective sectors. Mr. Baban also added that a top priority is providing sustainable water resources, which despite the presence of a large rainfall, five rivers and many lakes, may be threatened by the dam building of neighboring countries.

Many local conglomerates have started to shift their strategy and to invest into agriculture. Zozik Group, one of the five largest private companies in Kurdistan, is going ahead with a multimillion dollar livestock and dairy project with foreign partners, according to Faisal K. Khan Brandosti, company vice president.

Al Sofy Group of Companies, according to Ibrahim Sofy, General Executive Manager, is finishing one of the largest agricultural projects (greenhouse vegetables production) in Iraq.

And many medium size companies are now turning away from construction and contracting business to agriculture, like the Salaei Group, which is seeing more profit potential in the agricultural sector. The Kurdistan Region is rich in water resources with five large rivers that run through it. These include the Khapoor, Great Zab, Little Zab, Awaspee, and Seerwan. The total annual water flow capacity stands at 30 billion cubic meters. About 59.8 percent of the water sources of the rivers mentioned is from the Kurdistan Region, and 40.2 percent is sourced outside of the Region. The total arable land in the Kurdistan Region is 1,535,794 hectares. If the water is used properly, it could irrigate the entire land instead of the 11 percent it currently irrigates.

In addition to the five rivers mentioned above, the Region has springs, groundwater, and rain water from the annual rainfall of 8 billion cubic meters. However, most of it is wasted as it falls into the land and valleys without being used.

"Kurdistan: Agriculture Taking Second Place to Oil Development", 25/02/2013, online at: http://www.marcopolis.net/kurdistan-agriculture-taking-second-place-to-oil-development-2502.htm

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Iraq to Launch \$750 Million Water Projects in Basra

IRAQ, BAGHDAD — The Iraqi Ministry of Municipalities on February 25 announced \$750 million USD worth of new water projects in Basra.

The projects include a 9,000-cubic-meter-per-hour desalination plant, where water from Al Badaa Canal will be mixed with saline water from Shatt al Arab before being transported to residential areas in Basra.

They will also include rehabilitation and replacement of water pipelines, according to officials.

The Iraqi government will contribute 42 percent of the cost of the projects, while the Japanese government will provide the rest in the form of a soft loan, according to Iraqi officials.

The work will take up to three years to complete. Japanese company NGS is responsible for developing the initial designs for the projects.

"We have discussed the projects with Japanese government officials and the Japanese International Cooperation Agency (JICA)," said Municipalities and Public Works Minister Adel Mahawder.

"Basra is suffering from severe water problems, and this project will put an end to these problems," he explained.

Sabah al Bazzouni, head of the Basra Governorate Council, stressed how urgently desalination plants were needed to meet the steady increase in water demand in Basra.

"Basra is edging toward a water crisis because of the fact that other governorates transgress on its share of water," he said.

Basra has been suffering from severe water shortages, especially during the summer, since 2007.

The problem is exacerbated by the decline in water flow from the Euphrates and Tigris rivers and by Iranian authorities' cutting off of the flow of Al Karoun River.

In addition, increased salinity in water has led to a decline in agricultural productivity.

"Iraq to Launch \$750 Million Water Projects in Basra", 01/03/2013, online at: <u>http://www.ooskanews.com/daily-water-briefing/iraq-launch-750-million-water-projects-basra_26528</u>

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* A tale of two Iranian cities, battling for water

Outraged that precious water from their local river is being diverted, last week a group of farmers in Isfahan, Iran destroyed a pump channelling water to the city of Yazd. They've been guarding the pump day and night ever since, refusing to let the authorities fix it. Meanwhile, residents of Yazd are suffering from a severe water shortage, leading to fears of unrest there.

All week, the farmers guarding the pump, which is located just outside Isfahan, have been clashing with police. According to **opposition news sites**, Wednesday and Thursday's night's clashes have been the worst yet, with police opening fire on protesters with rubber and lead bullets, wounding many. Despite this, the demonstrators – whom our Observer in Isfahan says number in the several thousand – **have stayed put**.

The local branch of the Iranian Revolutionary Guard <u>blames "rebels"</u> for fostering violence, and says the clashes have resulted in injuries and arrests, without specifying any numbers. It also accuses them of attacking a local base belonging to <u>Basij</u> paramilitary volunteers.

Meanwhile, about 300 kilometres away in Yazd, <u>water is being rationed</u>. The local governor has <u>called</u> on Isfahan to promptly suppress the farmers' protest and repair the pump.

"Between a recent drought and government mismanagement of water distribution, farmers are really suffering now

Mehran (not his real name), who lives in Isfahan, is an expert on water distribution issues.

Farmers have been angry for a long time now, ever since the government started diverting water from our river, the Zayanderud, to the city of Yazd, out in the desert. This was about 15 years ago, back when Mohammad Khatami was president – it was a gift from him to Yazd, his hometown. Then, under our current government, more water was diverted to another nearby province, Charmahal-Bakhtiari. This has forced Isfahan to rely more on wells, but between a recent drought and mismanagement of water distribution, farmers are really suffering now. Many have lost their crops. There have been protests for months now; but when the farmers realised they weren't being heard, they decided to take this drastic step of blowing up the pump.

I've spoken to farmers, and they say they will keep fighting for their water, whatever the price. They refuse to let the authorities go near the pump unless they agree to stop giving any water to the city of Yazd. I don't think this is a reasonable demand, but I do think they have to raise their voices in order for the government to start managing water more equitably. I have studied this matter, and I am convinced that if they distributed water based on need, rather than politics, there would be enough water to go around.



Meanwhile, in the eastern suburbs of Isfahan, near where the pump is located, the police are on high alert and out in force. Clearly, they are afraid unrest will grow. The water shortages affect farmers the most, but they also affect lots of other industries here – metal work, tourism, etc... It's terrible for our economy.

"The water that now trickles from my tap tastes really bad"

Mahrokh is an engineering student living in Yazd.

About half of our water comes from the Zayanderud River. So after the pump was destroyed, the authorities linked up extra wells to the regular water network. However, there are rumours that the water from the well is not filtered, and that it is located dangerously close to sewage pipes. Indeed, the water that now trickles from my tap tastes really bad.

Ordinary people who don't follow the news or politics are blaming this shortage on the Isfahan farmers. Some are even saying we should stop supplying iron ore to Isfahan's factories. At my university, I've seen some arguing with other students from Isfahan about who is responsible for the water crisis. But when they really get to debating the issue deeply, everybody ends up agreeing that the real problem is the government's poor management of water supplies for decades now – not the people of Isfahan.

The local media don't talk much about the crisis, probably because they are afraid that this will cause panic to spread and incite people to rebel in the streets. However, the authorities sent text messages to our phones warning us that the water shortage is a serious problem and that we should reduce our consumption and drink as much bottled water as possible.

"A tale of two Iranian cities, battling for water", 01/03/2013, online at: <u>http://observers.france24.com/content/20130228-iran-isfahan-yazd-farmers-water-protest-pump</u>

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* Iran Farmers Clash With Police Over Water Diversion: AP

Farmers in central <u>Iran</u> clashed with police during a protest over the government's decision to divert water to a neighboring province, leaving several people injured, the AP said, citing Iranian media. The semiofficial Mehr news agency said today that the farmers agreed to hold talks with government officials to resolve the dispute that flared during a Wednesday protest.

Farmers in the Isfahan province of Varzaneh smashed a pipeline carrying water from Zayandeh Rood River to Yazd province. The farmers said they need the water because of a prolonged drought. Isfahan province has recently been the scene of sporadic rallies over water rights, AP said.

"Iran Farmers Clash With Police Over Water Diversion: AP", 02/03/2013, online at: http://www.bloomberg.com/news/2013-03-02/iran-farmers-clash-with-police-over-water-diversion-ap.html

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* Water Riot Breaks Out in Iran

Farmers in eastern Esfahan province yesterday, Feb. 27 fought off police special forces sent to provide security for the repair of a water pipeline that was destroyed last week, in a violent <u>water</u> <u>dispute</u> between Esfahan and Yazd.

In <u>scenes of the fight's aftermath</u>, captured on phone cameras, angry farmers and local residents of Varzaneh, 80km east of Esfahan, threw stones at the burning busses that had brought the police.

Another video shared on an Iranian community website that night showed several buildings on fire in Khorasgan, eastern Esfahan. The cameraman said that five people had been killed. Police and paramilitary units on motorbikes had crushed an earlier protest, and electricity and mobile-phone service had been disconnected, according to the person who uploaded the video.

The dispute started last Friday, Feb. 22 when Esfahani farmers burned pumps and line-control systems that brought water from Esfahan's Zayanderud River to the city of Yazd. Local farmers say factories in Yazd are depriving local farms of water.

The Zayanderud River is Iran's second-longest river, whose water has been diverted 270km (168 miles) to Yazd for the past 13 years. This has threatened the livelihoods of Esfahan's farmers and left Esfahan City's once-famous river dry.

"This used to be like Paris," said a guitarist playing to a group of friends in one of the arches that once directed water under the 'The Bridge of 33 Arches' in central Esfahan. "They have cut the heart out of our city so they can have industry in the middle of a desert."

On Tuesday, Feb. 26, Yazd Governor Mohammed Reza Fallah Zadeah told Iran's labor news agency that an intelligence officer had been sent from Tehran to "restore security" in Esfahan. He said Yazd had been rationing drinking water since the pipeline was fist broken on Friday.

But on the same day, Hossein Mohammed Rezaye, the head of the Association to Support East Esfahan Farmers, said that the farmers have no issue with Yazd using the river for drinking water. They are against the industrial use of the water "while Esfahan goes thirsty."

He said that drinking water requires a flow rate of only 500 liters per second, not the current 3,000 liters per second he claimed was being diverted to the desert city.

"We must understand the farmers who have a 3,500-year history of using this water defending their rights to water, and the rights of their wives and children, tooth and nail," Rezaye said. "The guest [Yazd] has come and thrown out the homeowner, and they have the audacity to make demands."



Hamid Reza Fouladgar, an MP for Esfahan, told parliament on Sunday he was against the destruction of the pipeline but that people "in the eastern part of Esfahan province can only make a living though farming, and if they don't have access to water, their livelihoods are jeopardized."

He said he had raised the farmers' concerns with President <u>Mahmoud Ahmadinejad</u>, who, he said, had made promises but not delivered on them.

"Water Riot Breaks Out in Iran", 28/02/2013, online at: <u>http://www.al-monitor.com/pulse/originals/2013/02/iran-water-riot-protests-youtube-video.html</u>

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Iranian farmers hold talks on water dispute after police clashes

DUBAI, March 2 (Reuters) - Farmers from a drought-stricken Iranian province who clashed with security forces in a protest over water supply have met officials in an attempt to settle the dispute, local media reported.

The farmers in central Isfahan province have for years protested against what they say is the unfair diversion of water from the Zayandeh Rud river to supply other areas, leaving their farms dry and threatening their livelihoods.

A pipeline transporting water to Yazd province was smashed in February, the opposition website Kaleme said. A demonstration by farmers near the pipeline on Wednesday led to clashes with security forces and three police buses were set on fire, Kaleme reported.

Demonstrations against authorities are rare in Iran, but there have been isolated protests by labour groups and consumers against delays in payment of wages and high food prices in the past year.

Fifty-five farmers met local officials to air their grievances, Isfahan provincial governor Alireza Zaker-Isfahani was quoted as saying on Saturday by Iran's semi-official Mehr news agency.

"During the meeting the farmers expressed their viewpoints and the provincial executive agencies also shared their issues with the farmers, and both sides were looking to solve the problems," Zaker-Isfahani said.

"The issues of the last few days caused problems both for the farmers and for the executive agencies, and we believe that we cannot respond to demands in a volatile environment."

Isfahan's Friday prayer leader, Ayatollah Seyyed Yousef Tabatabaei-Nejad, said the smashing of the pipeline to Yazd was against Islamic law, but expressed sympathy for the farmers' plight.

"The livelihood of the people of east Isfahan is dependent on farming and provincial officials must help them in other ways in the current drought conditions," he was quoted as saying by Mehr on Saturday. (Reporting by Yeganeh Torbati; Editing by Pravin Char)

"Iranian farmers hold talks on water dispute after police clashes", 02/03/2013, online at: http://www.trust.org/alertnet/news/iranian-farmers-hold-talks-on-water-dispute-after-police-clashes/

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Rocking the Cradle

The Fertile Crescent is a term most of us haven't heard outside of a history class. As students, we learned the Fertile Crescent encompassed some of the most important cities and locales of early civilization: Mesopotamia, the Tigris and Euphrates Rivers, and—of course—the Nile. The area is also known as "the Cradle of Civilization" and is not only the birthplace of several ancient kingdoms, but also the breeding ground of many early technological innovations, including writing, glass, and the wheel. Surrounded by desert, the Fertile Crescent supplied early civilizations with fertile soil, pastures for their flocks, and—most importantly—water.

But now, it seems, the crescent is drying up. According to <u>scientific analysis</u> of recent satellite images of the region, experts estimate that 90% of the area's marshlands have dried out—turning what was once a swath of fertile land that sustained generations into miles of patchy salt and sand. Egypt, in particular, has been hard hit by these environmental changes, but encroaching desert is not the only issue. Constrained by the 1959 Nile Water Agreement (which allocated 55 billion cubic meters to the country), subject to an old network of leaky pipes and a growing population, and faced with increasing pollution and ineffectual regulation, Egypt is facing a <u>water crisis</u>.

Earlier this month, a panel of experts discussed Egypt's water resource management problem during a talk titled "Growing Thirst: Sustainable Water Solutions for Egypt" as part of the 13th annual Cairo Climate Talk conference. On the table for discussion: the adverse impact of climate change on Egypt's already-strained water resources. As Tarek Kotb, First Assistant Minister (Ministry of Water Resources and Irrigation),<u>warned</u> panel members, Egypt will transition from water scarcity to "drastic water stress in the next 40 years if no sustainable water management is put in place." "Egypt loses about 50% of its freshwater through poor maintenance of supplies and distribution problems, and the water is polluted," says Claudia Bürkin, the Water Sector Coordinator for the German Development Cooperation and Senior Programme Manager at KfW Development Bank. "Egypt needs to set up strong standards for water quality and control the drainage nutrients, pesticides, and waste found in the water."

Solutions to Egypt's problems are varied, with some calling for improved infrastructure development, and others calling for reduction in agricultural water use via incentives and education. Some are even suggesting that officials reach to locals to tap into "indigenous knowledge" that can perhaps "provide answers and climate resilience."



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So what do you think? Is Egypt's situation unique, or just an extreme example of what many "waterscarce" nations can expect in the coming decades? With aging infrastructures dominating conveyance systems all over the globe, when will we reach the tipping point where rehabilitation and repair change from "options" to mandates? And can we learn anything from the successes and failure of other countries that are, perhaps, battling challenges that lay ahead of us as well?

"Rocking the Cradle", Elizabeth Cutright, 26/02/2013, online at: http://www.waterefficiency.net/WE/Blogs/1602.aspx

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The Arab Spring and Climate Change

A Climate and Security Correlations Series

Over the past two decades, the role of planetary changes—the human impact on climate, biodiversity, and natural resources, from water to fish to forests—have exacerbated the perils of the human condition even as technological advances have created whole new worlds.

Crime-show devotees will be familiar with the idea of a "stressor"—a sudden change in circumstances or environment that interacts with a complicated psychological profile in a way that leads a previously quiescent person to become violent. The stressor is by no means the only cause of the crimes that ensue, but it is an important factor in a complex set of variables that ultimately lead to disaster.

"The Arab Spring and Climate Change" does not argue that climate change caused the revolutions that have shaken the Arab world over the past two years. But the essays collected in this slim volume make a compelling case that the consequences of climate change are stressors that can ignite a volatile mix of underlying causes that erupt into revolution.

This volume of essays includes the following contributions:

- Troy Sternberg of Oxford University begins by investigating the connections between climate events in other parts of the world and social unrest in the Arab world. More specifically, he looks at drought conditions in China, subsequent global wheat shortages, and how those shortages may have influenced the Egyptian uprisings. In his own words, he paints a picture of "how a localized hazard became globalized."
- Sarah Johnstone and Jeffrey Mazo of the International Institute for Strategic Studies investigate the vulnerability of the Middle East and North Africa region to fluctuations of food supply and prices both globally and locally, and how current and projected climatic changes interact with those phenomena. They conclude that, "The Arab Spring would likely have come one way or another, but the context in which it did is not inconsequential. Global warming may not have caused the Arab Spring, but it may have made it come earlier."
- Francesco Femia and Caitlin Werrell of the Center for Climate and Security address the influence of climate change before social and political unrest developed into large-scale conflict in Syria—a country many analysts initially deemed impervious to the Arab Spring, also known as the Arab Awakening—the projected influence of climate change after the Arab Awakening in Libya, and possible water-security solutions for building climate resilience that may simultaneously enhance cooperation and aid in resolving conflict.
- Michael Werz and Max Hoffman of the Center for American Progress investigate how "security in one place is irrevocably linked to stability in distant regions." Werz and Hoffman use the Arab Awakening as a backdrop to explore how a 21st-century security strategy must account for "transcendent challenges," including the nexus between climate change, human rights, and migration.



 David Michel and Mona Yacoubian of the Stimson Center explore how the Arab world could transform the risks posed by climate-change factors into sustainable economic growth and jobcreating opportunities. Michel and Yacoubian look specifically at how "greening" Arab economies by adopting innovative technologies and forward-leaning government policies can simultaneously bolster employment and mitigate environmental risks, "turning two of the region's pre-eminent challenges into a significant opportunity."

All of these authors are admirably cautious in acknowledging the complexity of the events they are analyzing and the difficulty of drawing precise causal arrows. But consider the following statements:

- "A once-in-a-century winter drought in China contributed to global wheat shortages and skyrocketing bread prices in Egypt, the world's largest wheat importer." (Sternberg, p. 7)
- "Of the world's major wheat-importing companies per capita, "the top nine importers are all in the Middle East; seven had political protests resulting in civilian deaths in 2011." (Sternberg, p. 12)
- "The world is entering a period of 'agflation,' or inflation driven by rising prices for agricultural commodities." (Johnstone and Mazo, p. 21)
- "Drought and desertification across much of the Sahel—northern Nigeria, for example, is losing 1,350 square miles a year to desertification—have undermined agricultural and pastoral livelihoods," contributing to urbanization and massive flows of migrants. (Werz and Hoffman, p. 37)
- "As the region's population continues to climb, water availability per capita is projected to plummet. … Rapid urban expansion across the Arab world increasingly risks overburdening existing infrastructure and outpacing local capacities to expand service." (Michel and Yacoubian, p. 45)
- "We have reached the point where a regional climate event can have a global extent." (Sternberg, p. 10)

These assertions are all essentially factual. None of them individually might be cause for alarm. Taken together, however, the phenomena they describe weave a complex web of conditions and interactions that help us understand the larger context for the Arab Awakening. Indeed, as Johnstone and Mazo argued as early as April–May 2011, in an article written just at the outset of the Tunisian and Egyptian revolutions, it was already possible to see that climate change played a role in the complex causality of the revolts spreading across the region. They called it a "threat multiplier." It significantly increased the interactive effects—and hence the overall impact—of political, economic, religious, demographic, and ethnic forces.

This concept of a "threat multiplier" is a helpful way to think about climate change and security more broadly. In Syria, for instance, as Femia and Werrell tell us, a combination of "social, economic, environmental and climatic changes ... eroded the social contract between citizen and government in the country, strengthened the case for the opposition movement, and irreparably damaged the legitimacy of the Assad regime." In Libya, according to the same authors, Qaddafi used oil revenues to finance the "Great Man-Made River Project," one of the largest water engineering projects in the world—and quite unsustainable. Libya is 93 percent arid, and the aquifers it is draining for the



project are shared by Egypt, Chad, and Sudan. Moreover, climate projections estimate that Libya's "drought days" per annum will rise from more than 100 to more than 200—an enormous and potentially devastating increase. It is not difficult to see how these conditions multiply the threats already facing Libya's fragile new government. On the other hand, Femia and Werrell outline a much more positive vision of how water-management projects could help bring otherwise-divided parts of Libyan society together.

Beyond individual countries, if we accept the conclusions of the authors collected here, then we must expect a continuing and increasing interplay between climate, land, water, food, migration, urbanization, and economic, social, and political stress. Yet almost none of those issues shows up in a traditional course on international relations, which focuses far more on the traditional geopolitics of interstate relations, particularly the distribution of military and economic power among a handful of the most important states. Insecurity in this world is defined largely in terms of military threats posed by rising or declining powers; security dilemmas between rival states, which must assume worst-case motivations on one another's part; physical and virtual terrorist attacks; and denial of access to any of the world's common spaces—ocean, air, outer space, and, increasingly, cyberspace. Yet intrastate violence, instability, and revolution all create their own turmoil. The geopolitical results of the Arab Awakening are felt in the political realignment of states such as Egypt following the political victory of the Muslim Brotherhood in recent elections, and the determination of states such as Saudi Arabia and Qatar to arm specific factions in the civil war in Syria as part of a proxy war with Iran. Moreover, violence and pervasive political uncertainty across the Middle East inflicts its own economic costs: unstable oil prices, streams of refugees and migrants to more developed countries, and the opportunity costs of investment forgone across a region that has served as a global crossroads since the beginning of human civilization.

It follows, as Werz and Hoffman conclude, that, "The United States, its allies, and the global community must de-emphasize traditional notions of hard security more suited to the Cold War and focus on more appropriate concepts such as human security, livelihood protection, and sustainable development." Foreign policy initiatives focused on human-security issues offer ways to:

- Diminish distrust of the United States
- Bring together a wide range of civic and corporate partners, both in country and from abroad
- Transcend conflicts over resources such as water and grazing land among rival groups by creating avenues for constructive cooperation on issues including water management and crop adaptation
- Engage specific groups of a population such as women, youth, entrepreneurs, or religious communities

In response to this new emphasis on human security, Michel and Yacoubian detail a number of encouraging international initiatives to "establish networks of renewable energy projects linking Arab countries to each other and to export markets in Europe and Africa" and laying the foundations for green growth.

Former U.S. Secretary of State Hillary Clinton understood the value of this type of engagement from the very outset of her tenure. The first Quadrennial Diplomacy and Development Review in 2010



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sought to develop and institutionalize new organizational structures and policy tools specifically designed to engage societies, as well as governments. Consider the creation of an under secretary for civilian security, democracy, and human rights replacing the under secretary for democracy and global affairs in the State Department. The new under secretary oversees five important bureaus, two of which—the Bureau of Counterterrorism and the Bureau of Conflict and Stabilization Operations—are newly created. The other three are the Bureau of International Narcotics and Law Enforcement, the Bureau of Democracy, Human Rights, and Labor, and the Bureau of Population, Refugees, and Migration. Each of these bureaus focuses on a different dimension of human security:

- Protection from violence in conflict-torn states and the rebuilding of state institutions
- Protection from the violence and corruption inflicted by global criminal networks in drugs, arms, money, people, and violent extremism
- Protection of basic human rights
- The meeting of basic human needs in times of migration and displacement

Within these bureaus and in offices reporting directly to the secretary of state can be found a host of new ambassadors and senior representatives for issues such as:

- Global empowerment of women
- Creation and maintenance of public-private partnerships
- Global youth issues
- Establishment of regional and global networks of entrepreneurs
- Outreach to Muslim communities around the world
- Support of civil society

The new Bureau of Energy Resources also focuses on energy security for the United States and its allies—a task that requires close coordination with the special representative for climate change. These initiatives are far more than one secretary of state's whim. They build on a growing recognition beginning at the end of the Cold War that global problems, crises, and conflicts were resulting from a more complex and intertwined set of causes. Over the past two decades, the role of planetary changes—the human impact on climate, biodiversity, and natural resources, from water to fish to forests—have exacerbated the perils of the human condition even as technological advances have created whole new worlds. Foreign policy, which has always been about advancing one nation's interests and values with respect to those of other nations, is now increasingly about solving national, regional, and global problems that affect us all in myriad and often unpredictable ways.

"The Arab Spring and Climate Change" is a title that will still strike many readers as a very strange juxtaposition. But as the contents of this volume make clear, it describes the interplay of factors that will demand an increasing amount of our attention going forward.

"The Arab Spring and Climate Change", Caitlin E. Werrell, Francesco Femia, and Anne-Marie Slaughter, 28/02/2013, online at: <u>http://www.americanprogress.org/issues/security/report/2013/02/28/54579/the-arab-spring-and-climate-change/</u>

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* The Israel-Syria Connection: What Next?

Up until recently, one of the attractive areas to visit in Israel has been the Golan Heights. Israel captured this elevated plateau, located on the Israeli-Syrian border during the Six Day War in 1967. Since the Golan was considered an important strategic buffer between the two hostile states, Israel <u>annexed the Golan Heights</u> in 1981, making it legally part of Israel (although not accepted by the international community).

Starting in the 1990s, successive Israeli governments -- from Rabin to Netanyahu -- have engaged the Syrian regime in unsuccessful <u>peace negotiations</u>. Although the exact details of the talks conducted between Rabin and later Barak with Hafez al-Assad are not known, the general outlines are pretty clear. Evidently in 2000, the sides were inching towards a peace accord. From the Israeli perspective, a peace agreement with Syria was a package deal that included Lebanon.

At the time (1999-2000), Syria controlled Lebanon politically and Israel had been ensconced in the south of the country in a so-called security zone for 18 years. Hezbollah, a Syrian ally and an Iranian proxy was causing annual Israeli casualties. By 1999, there was a grass-roots movement in Israel calling for a withdrawal from Lebanon. Prime Minister Ehud Barak was interested in securing a peace settlement with Syria that would include a secure border with Lebanon. In that scenario, Israel's hand would be strengthened vis a vis the Palestinians, with whom Barak would also have to negotiate. Israel it, seems, was willing to give up the entire Golan Heights under the condition that the area would be completely demilitarized reaching as far as the outskirts of Damascus. Israel would be allowed to maintain a surveillance station on the Hermon Mountain for several years as an early warning system. Syria, whose economy was in dire straits, would receive an attractive financial aid package from the U.S. and would distance itself from terror organizations such as Hezbollah. And, as mentioned, quiet with Lebanon would be part of the agreement.

Evidently, the entire deal fell apart due to a dispute over ten meters of territory. Israel was willing to withdraw to the international border that had been delineated in 1923 and was reiterated in the Armistice accords signed between the two sides in Rhodes in 1949. Syria demanded a complete Israeli withdrawal from the entire Golan Heights up to the positions they (the Syrians) had held on June 5, 1967. The Syrians had managed to creep to the shore's edge of the eastern bank of the Sea of Galilee before 1967. In principle, this would have given the Syrians water rights on the fresh water



lake. The Sea of Galilee at the time (1999) constituted one third of Israel's water sources and was considered a strategic reserve for a water poor country. The negotiations fell apart on that small sliver of real estate.

Following the failure of the talks between Barak and Assad, the Israeli government redeployed from Southern Lebanon in the summer of 2000, withdrawing to the international border as marked by the UN. The move was taken unilaterally, without any agreement with Lebanon. Over the course of the following 6 years, Hezbollah launched several attacks across the Lebanese border into Israel. That and the Hezbollah assault on Israeli troops in the summer of 2006 was one of the causes of the Second Lebanon War.

In 2007-8, negotiations were renewed between Israel and Syria, under Prime Minister Ehud Olmert and President Bashir al-Assad through the mediation of

Turkeyhttp://www.nytimes.com/2008/05/22/world/middleeast/22mideast.html?_r=0. From the Israeli perspective the conditions had changed. The Sea of Galilee no longer had the strategic importance of the past as Israel had be un to massively desalinate. Similarly, the situation in Lebanon had changed. Syria had lost it grip on the Lebanese regime. On the other hand, Syria and Iran had become close allies. Israel now viewed the Iranian drive to achieve nuclear weapons as an existential threat. Anything that could undermine the Iranian strategic position in the neighborhood was extremely desirable from Israel's perspective. The conditions for a peace treaty between Syria and Israel had subtly changed. Now, Israel would be willing to pull back to the line the Syrians had demanded in 2000. Syria would have to disengage from Iran and desist from aiding and abetting the transfer of Iranian weapons, know-how and advisors to Hezbollah through its territory. We don't really know how close the sides were to closing the deal, but according to foreign reports, which Israel denied, in 2007 Israel bombed a nuclear facility in Syria that was moving towards being operational. Eventually, the talks between Olmert and Assad broke down in 2008. Surprisingly, there were recent reports that Prime Minister Netanyahu had been secretly negotiating with Assad when the Arab Spring hit Syria in 2011. And one can safely assume that there will be no resumption of talks between Israel and Syria until the end of the present civil war. Where do things stand today? Israel has several concerns regarding Syria. Given the destabilization of the Assad regime, there are fears that terrorists will begin to launch attacks against Israel from the Syrian Golan. There is a recent precedent. While Egypt was in the throes of its "spring," terrorists crossed over from the Sinai Peninsula into Israel and killed eight Israelis. Since some of the forces



fighting Assad are not Syrian -- they are al Qaeda or Salafist militants from abroad -- there is a definite possibility that we will see the beginning of cross-border attacks from Syria into Israel.

Another major Israeli concern is the transfer of weapons from Syria to Hezbollah. Syria has one of the largest concentrations of chemical weapons in the world. Sophisticated anti-aircraft missiles or the aforementioned chemical weapons in the hands of Hezbollah could change the balance of power with Israel. This, of course is an unacceptable situation from Israel's perspective. A few weeks ago, there were multiple air raids against convoys heading from Syria to

Lebanon<u>http://www.cbsnews.com/8301-202_162-57566733/israel-launches-air-strike-inside-syria/</u>. Israel has not officially taken responsibility.

A basic assumption is that once the regime falls, there might be a massive retaliation against the Allawite minority that has ruled Syria since the late 1960s. This could cause a flight of hundreds of thousands of refugees, some of whom might seek refuge in Israel. How Israel should and could react to such a situation is something that both the Israeli military and government must decide upon.

Finally, a post-Assad Syria, even if it maintains its territorial and ethnic integrity, might be a more hostile neighbor, especially if a pro-Iranian or alternatively a Moslem Brotherhood regime were to emerge.

The clock is ticking.

"The Israel-Syria Connection: What Next?", 26/02/2013, online at: <u>http://www.huffingtonpost.com/avi-benhur/syria-israel_b_2755346.html</u>

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***** The unequal right to water in unrecognized Bedouin villages

By ruling that Bedouin citizens of Israel have only the right to 'minimum access' to water rather than 'equal access,' the Israeli Supreme Court established that the rule of law does not apply to Bedouin citizens. The resulting situation is intolerable for a country that claims to be a democracy, but is fitting for a country that defines itself only as a 'Jewish state.

On February 20, the Israeli Supreme Court dismissed an appeal by residents of the unrecognized Bedouin village of Umm El-Hiran in the Naqab (Negev), demanding minimum access to drinking water. which holds 500 residents. The appeal was filed by Adalah, the Legal Center for Arab Minority Rights in Israel on behalf of the village's 500 residents.

The residents of the village Umm El-Hiran arrived in 1956 when they were forced to move there by the Israeli military commander. Today, 58 years later, they get their drinking water from a water tank provided by the Israeli Water Authority, which decided to locate the tank eight kilometers away from the village. Alternately, the residents can to purchase drinking water from a private family that lives four kilometers away. The latter option is complicated by the fact that there are disputes between some villagers and that private family. More importantly, the family charges a higher price for water than the one set by the Water Authority.

In other words, although the state is responsible for providing drinking water directly and equally to all its citizens, the village residents can either get the water by themselves from the water tank a lengthy distance away or live under the grace of a private family and pay more than all other citizens. Meanwhile, the nearby Jewish community of "Amos," which consists of only one family numbering a few persons, is connected to water infrastructure that reaches directly to their home with proper facilities – just like the other 30 or more individual Jewish settlements in the Naqab.

The Supreme Court's decision in February ended an eight-year legal struggle in different Israeli courts. This situation did not come about as a result of lack of natural resources but rather because of an intentional governmental policy not to connect Umm El-Hiran, as well as another 90,000 other Bedouin living on their ancestral lands in 34 unrecognized villages, which are unconnected to water



sources to this day. The government has made it clear that the policy is intended to pressure and coerce the Bedouin residents to leave their land by denying them services. The purpose of this evacuation policy is to enable the establishment of new Jewish towns on the same land, create industrial zones under the jurisdiction of Jewish towns or even for the mere purpose of forestation.

This court decision follows a previous ruling issued by the Israeli Supreme Court in June 2006, which dealt with the villagers' demand to connect their houses to drinking water infrastructure. In a precedent ruling, the court held that the right to water is part of the constitutional right to minimum standard of living, which itself is anchored in the constitutional right to dignity. However, it ruled that citizens living in those unrecognized villages are not entitled to a direct connection to drinking water in their homes. The court basically accepted the state's argument that the purpose of the refusal to connect the villages to water is the fact they are not recognized by the state, and thus the villagers are trespassers. As such, they are not entitled to any of these services, no matter how basic and essential, including water, electricity, education and health, etc.

The state also declared in court that if it connects the unrecognized villages to water it will "encourage the continuing phenomenon of the unrecognized villages," and thus by denying permanent water sources it can create an "incentive for the Bedouins to move to villages established by the state itself" – further evidence that the state is using the water issue to pressure villagers to evacuate their land. The court confirmed that the purpose of this policy is adequate and reasonable.

However, the court added that the villagers are entitled to minimum access to water, as an essential resource, without defining "minimum access." The only exception for which the court allowed direct water connection to the residents' houses was for "special humanitarian considerations." After reviewing the case of Umm El-Hiran, the court concluded it is not clear that the water tank eight kilometers away meets the criteria of "minimum access," and ruled that their case should go back to the Water Authority for re-examination. Adalah appealed on behalf of the villagers to the Water Authority to reconsider providing "minimum access" to water closer to the village; the Authority dismissed the request. Adalah's next appeal, to the Water Tribunal, was dismissed as well.

As a result the case reached the Supreme Court again. This late action resulted in the most recent court decision, which once again justified the government's policy of "encouraging" the villagers to



move from their lands while declaring again that the current circumstances sufficiently meet the "minimum access" to water criteria.

With this ruling, the court established that the rule of law does not apply to Bedouin citizens of Israel. In upholding the state's argument that denying the water could pressure Bedouin citizens to move from their land and that the villagers are entitled to "minimum access" to water rather than "equal access" like other citizens, the Israeli court basically justified the refusal to connect citizens to drinking water as a tool for punishing all Bedouin who refuse to leave their land. This goes hand-in-hand with the fact that Israeli authorities intentionally resist recognizing Bedouin land ownership rights.

The resulting situation is intolerable for a country that claims to be a democracy, but it is tolerable for a country that defines itself only as a "Jewish state." The court refused to acknowledge that this group of its citizens is entitled to "equal" access to water, sticking instead with "minimum access." That places Bedouin citizens on a lower level than other Israeli citizens in terms of constitutional rights.

Thus the justice system officially refrained from declaring them equal to other citizens. Finally, providing an exception for direct connection to drinking water based on "special humanitarian considerations" moves the discourse of Bedouin rights from a constitutional and human rights issue into the framework of humanitarian rights. Humanitarian legal frameworks are applied in situations of occupation, such as Israel's occupation of the West Bank. In effect, Israel's occupation mentality is being legally applied inside the Green Line, and places Bedouin citizens under the authority of an occupying power.

"The unequal right to water in unrecognized Bedouin villages", 01/03/2013, online at: <u>http://972mag.com/the-unequal-right-to-water-in-unrecognized-bedouin-villages/66932/</u>

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✤ Israeli-Palestinian team studies local water

BGU prof. Alon Tal leads group of scholars testing the area's water supply for endocrine-disrupting chemicals.

A group of Israeli and Palestinian environmental scholars have started on a joint effort to test the area's water supply for potentially health-altering endocrine-disrupting chemicals.

At their head is Prof. Alon Tal of Ben-Gurion University's Jacob Blaustein Institute for Desert Research at Sde Boker. He is also co-chairman of the Green Movement and ran for Knesset on Tzipi Livni's ticket.

While people – and even their farm animals – continue to consume more and more medicines and chemicals, the effect of these substances once they have passed through the body and into the country's water system are unknown, Tal explained. No one in Israel, or the Palestinian Authority, is currently looking for the presence of these chemicals or their effects "in a systematic way," he added.

"Now we are on the hunt for the smoking gun," Tal told The Jerusalem Post on Tuesday. "It is my hypothesis that Israel's enthusiasm for water reuse has grave implications."

Tal has received a three-year, \$560,000- grant from the USAID's Middle East Regional Cooperation (MERC) Program to conduct the project. Many of his own students from Sde Boker will conduct the lion's share of the laboratory testing in Health Ministry labs.

In the Palestinian contingent is water engineer Nader al-Khateeb, who also serves as Palestinian director of Friends of the Earth Middle East; Dr. Alfred Abed Rabbo, an assistant professor at Bethlehem University's Water and Soil Research Unit; Dr. Shai Armon; and a group of Palestinian students, Tal explained.

As the presence of testicular cancer increases among the population's males and average menstruation age drops among females, Tal stressed that it is crucial to get to the root of the conundrum. While one might say that hormone levels are changing due to consumption of hormone-laden beef, Israelis in general do not consume an enormous amount of beef, he explained. One of the main areas where 11 Sde Boker students have already begun sampling is the Yarkon River, which has never experienced such a thorough monitoring, according to Tal. The team will also be testing the sewage treatment originating from Yeruham Lake, he said. Within the bounds of the PA, in addition to assessing stream water, the group will be testing the waters at the authority's only secondary sewage treatment plant – in Al-Bira – and those at the two deteriorating sewage treatment plants in Nablus and Tulkarem.

"I think this is going to take to the next level what we know about streams," Tal said.



After the sampling occurs, the team members employ Health Ministry laboratories to screen them through gas chromatographs, he explained. The first initial results will begin to emerge within a few months. Each sample costs about \$1,000 to perform and assess, and the group has already conducted 56 samples.

The researchers are checking the water content at an extremely detailed level, in trace amounts of parts per billion, Tal explained.

"What we don't know are the synergistic effects – when you have a suite of, say, 20 chemicals that work in concert," he said.

Tal was particularly appreciative of the strong group of students working with him, most of who he said are women – both on the Israeli and the Palestinian side.

"I have had over 40 master's students over past several years, but I cannot remember a group that is collectively as assiduous as this group," he said.

Expressing gratitude to the American government for providing the funds, Tal stressed how important it is for Israel to take the lead on this type of research.

"I really believe that this is the cutting edge in environmental health research," he said. "Because Israel is the world leader in waste-water reuse by so much, we have a responsibility to monitor this in terms of human health."

"Israeli-Palestinian team studies local water", 27/02/2013, online at: <u>http://www.jpost.com/Sci-Tech/Article.aspx?id=304677</u>

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How Israel beat the drought

This country was on the brink of water catastrophe, reduced to running relentless ad campaigns urging Israelis to conserve water even as it raised prices and cut supplies to agriculture. Now, remarkably, the crisis is over

Until a couple of years ago, Israeli radio and TV regularly featured commercials warning that the country was "drying out."

In one of the most powerful TV ad campaigns, celebrities including singer Ninet Tayeb, model Bar Refaeli and actor Moshe Ivgy<u>highlighted the "years of drought"</u> and the "falling level of the Kinneret." As they spoke plaintively to camera, their features started to crack and peel — like the country — for lack of moisture.

So compelling was this ad, so resonant its impact, I hadn't actually realized it was no longer on the air. Alexander Kushnir put me straight. "We decided it simply wasn't justified to alarm Israelis in this way any longer," said Kushnir, who heads Israel's Water Authority.

How so? Israelis don't need to watch their water use any more? Isn't this region one of the world's most parched? Haven't we been warned for years that the next Middle East war will be fought over water?

Kushnir's answers: Yes, Israelis must still be wise with their water use. Yes, emphatically, this is a desert region, desperately short of natural water. And yes, we have indeed been worried for years about the possibility of water shortages provoking conflict.

But for Israel, for the foreseeable future, Kushnir says, the water crisis is over. And not because this happens to have been one of the wettest winters in years. Rather, he says, an insistent refusal to let the country be constrained by insufficient natural water sources — a refusal that dates back to David Ben-Gurion's decision to build the National Water Carrier in the 1950s, the most significant infrastructure investment of Israel's early years — led Israel first into large-scale water recycling, and over the past decade into major desalination projects. The result, as of early 2013, is that the Water Authority feels it can say with confidence that Israel has beaten the drought.



Speaking to The Times of Israel from the authority's offices in Tel Aviv, Kushnir identifies that refusal to "rely on fate" as the key to a genuine strategic achievement — a rare, highly positive change in an age and a region where most of Israel's challenges appear to be worsening, not receding, much less disappearing.

"How did we beat the water shortage? Because we *said* we would. We *decided* we would," says Kushnir, a big man with a warm smile and a robust Russian accent. "And once you've made that decision, you build the tools to reduce your dependence. We're on the edge of the desert in an area where water has always been short. The quantity of natural water per capita in Israel is the lowest for the whole region. But we decided early on that we were developing a modern state. So we were required to supply water for agriculture, and water for industry, and then water for hi-tech, and water to sustain an appropriate quality of life."

The National Water Carrier — which takes water from the Sea of Galilee (Lake Kinneret) south through the whole country to Beersheba and beyond — exemplified Israel's ambition. Contemplated even before the modern state was founded, its planning and initial construction were "a dominant feature of the first Ben-Gurion government — an unprecedented investment," Kushnir notes. "It stressed our desire to achieve a different reality."

Carrying almost 2 million cubic meters a day nationwide, that supply line, together with water from underground aquifers, kept Israel watered through the 70s. By the 1980s, though "we had a bigger population, bigger needs and the natural resources were overstretched. So we experimented with a small desalination plant in Eilat. And we began recycling purified sewage, and bringing industry into purifying water."

"Use any superlatives you like," urges Kushnir, to describe the fact that, today, "over 80% of our purified sewage goes back into agricultural use. The next best in the OECD is Spain with 17-18%. It's so justified energy-wise, and environmentally as well."

But even these innovations weren't enough to meet the needs of an ever-growing population through the 1990s and into the 2000s, the more so when the rains failed. Average rainfall in Israel is about 1.2 billion cubic meters. But in relatively dry years, it can sink to 900 million.

As the gulf between available water resources and needs widened, Israeli agriculture moved away from water-intensive crops and pioneered enormously improved efficiency, with trailblazing drip irrigation techniques. Israel also increased the use of brackish water in agriculture. And all that still


wasn't good enough. "We knew we had to be careful not to hurt our natural resources," says Kushnir. "Ultimately, we had no choice but to reduce the supply of natural water to agriculture, and to increase prices, which hurt our agricultural sector."

Plainly, this was no long-term solution. Elsewhere in the region, poorly managed countries were over-drilling, over-using, and risking major damage to natural sources. "In Syria, for instance, they drilled wells everywhere and destroyed aquifers," he says. "They had irrational, erratic water management and a lack of government policy." Even before two years of civil war began, Syrians turned on their taps and got nothing most days of the week.

"By 2000 our balance was really strained," says Kushnir. "We would have had to cut back drastically in agriculture or industry or home use and we weren't prepared to do that. We didn't want to switch off the water to a population in Israel which has enough problems to deal with."

The solution was desalination, on a major scale — the third phase in a water revolution that had begun with the water carrier and continued with recycling. The first large desalination plant came on line in Ashkelon in 2005, followed by Palmahim and Hadera. By the end of this year, when the Soreq and Ashdod plants are working, there'll be five plants — built privately at a cost of NIS 6-7 billion (about \$2 billion).

Israel uses 2 billion cubic meters of water per year — which is actually a little less than a decade ago, as efficiencies have been introduced in agriculture (which uses 700 million), and water-saving awareness has permeated. Of that two billion, half will be "artificially" manufactured by year's end — 600 million cubic meters from those desalination plants, and 400 from purified sewage and brackish water.

"We're not the world's biggest desalinators," notes Kushnir, "but no one has made the shift so fast to a situation where half of its water needs are filled from 'artificial' sources. And it means we are now ready for the next decade, without dramatic dependence on rainfall fluctuations."

Kushnir regards this as a remarkable achievement — "a lesson for the rest of the world," he says, "or at least those many parts of the world that are grappling with variants of the difficulties Israel has overcome."So the "Israel's drying out" ads have gone off the air, and the panicked warnings are over. But that doesn't mean Israelis should now wash their cars with sloshing abandon, shower for hours, or hose their lawns (if they're lucky enough to have one) day and night.



"In our region, you always have to save water," Kushnir stresses. "There has to be intelligent water use. But I'm not going to scream at people anymore."

The campaigns were demonstrably effective; they reduced water use by at least 10 percent, Kushnir says. "In 2000, it was 100 cubic meters per person per year. Nowadays it's 90. That saved us a desalination plant."

But Israel can afford to relax, at least a little. "Our job is to ensure that when you turn on the tap, water comes out," says Kushnir. "Well, we've done that. People have to continue to be smart. This isn't London or Washington, DC. You have to use water as appropriate to our region. There has to be awareness that water is a precious resource, and we have to manufacture much of it, and that costs money. The manufacture also creates carbon dioxide and that affects the environment. So, I'm not trying to scare the public. You want water, here's water. Use it. Use it as you want, but use it wisely." Where does Kushnir stand on global warming? Does he see it impacting annual rainfall? "There are dramatic changes in water fall," he responds. "We need to be prepared for graver, longer droughts. If we see global warming having more of an effect, we'll have to increase the desalination factor. If not, we'll stay at the current fifty-fifty.

"Personally," he goes on, "I'm a bit skeptical that global warming is a consequence of human activity. There is partial proof that human activity has exacerbated it. [But] it might be normal fluctuations. Remember," he adds, "I'm supposed to be skeptical when I decide where to spend our billions."

For all the announced success, should we be concerned that it might have come too late — that desalination should have been implemented earlier, reducing the heavy pumping from the Kinneret and the aquifers?

"Yes, we could have started desalination earlier. The damage to our natural resources would have been lighter," Kushnir agrees. "We came very close to the black lines in the aquifers and the Kinneret which could have caused multi-year damage. Did we do harm? I hope not. But we're moving away from the black lines now, even from the warning red lines. The immediate refilling and rehabilitation of the Sea of Galilee looks nice, but the aquifers are the key and we're still 1 billion cubic meters to the optimal levels. Yet we're legitimately optimistic." (As of late February, the Sea of Galilee was at



210.24 meters below sea level, its highest level in seven years, which is a healthy 2.65 meters above the "lower red line" and 1.56 meters below the "upper red line" — the point at which the lake is considered full.)

At the same time as desalination has supplemented natural sources, he adds, Israel has also become more efficient in the collection of rainfall. "As we improve, our aquifers will refill. Our springs will fill up. Then we'll really have done our bit."

What about the rest of the immediate neighborhood, those who work with Israel, and those who are hostile to Israel?

Kushnir says Israel supplies an annual 100 million cubic meters in total to the Palestinian Authority (30 million) and to Jordan (70 million), in line with formal agreements. He says the PA has failed to develop all the infrastructure necessary to maximize available water, and would reach "reasonable, appropriate levels" if it did so. "They can take quite a lot from the eastern aquifer. There are natural sources they didn't develop. It's detailed in the interim agreements." He also says that among Jewish settlers in the West Bank, water use is similar to that inside sovereign Israel.

Kushnir says he meets with the head of the PA's water authority, Dr. Shaddad Attili. "We speak to them all the time and we tell them how we managed, including by purifying sewage."

Attili, for his part, last October accused Israel of charging "extortionate" prices for the water it supplies, and the PA has claimed that Israel's refusal to let it drill in various locations above aquifers, as well as disappointing results from the developments it has introduced, force it to continue to depend upon those Israeli supplies.

"Our water market is no longer subsidized by the state," Kushnir responds, "not since 2007."

As for Jordan, Kushnir says the two countries work together effectively. Ever since the Israel-Jordan border demarcation was adjusted under the 1994 peace accord, Jordan has allowed Israel to maintain its drilling facilities inside what became Jordanian territory in the south, "and we help them in the north."



It was King Abdullah's father Hussein who would warn about water shortages prompting the next Middle East war. As far as Kushnir is concerned, the Israeli-Jordanian working relationship where water is concerned assuages any such worry. "There is such good mutual respect and interest," he says. "We help each other. [Relatively speaking,] they have water; their challenge is how to deliver it. There's the Red-Dead project where we can argue about the specifics. They're thinking of desalination in Aqaba. They have a plan for use of brackish water. They can solve their problems overall, and we'll be happy to help. The Israeli-Jordanian water agreement is an example of a deal where both sides benefit."

Beyond Jordan, though, has the fear of drought-stoked conflict disappeared? Israel, Syria and Lebanon have long contested water rights, and intermittently accused each other of abuses. Gaza faces acute water shortages.

"We know that geostrategic changes in the region can endanger our water sources," Kushnir allows. "We certainly can't afford to give up our natural resources."

Treading delicately, Kushnir notes that, despite the new successes, the Dead Sea, for instance, is "missing billions of cubic meters." One day, he muses, "Jordan, Syria, Lebanon and Israel could potentially redirect the waters of the Litani River," in Lebanon, to begin to address that challenge. "Of course, he adds, with magnificent understatement, "we would have to be in a situation of constructive dialogue."

For all that Israel's new water health is legitimately hailed as a remarkable achievement, that utopian vision — of Jordan, Syria, Lebanon and Israel engaged in "constructive dialogue" — would seem beyond the foreseeable ambitions of even the most skilled and optimistic of rainmakers.

"How Israel beat the drought", 26/02/2013, online at: http://www.timesofisrael.com/how-israel-beat-the-drought/

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* 'Water crisis as much about management as nature'

Expert says solutions should include increased water recycling and reuse as well as more effective pricing mechanisms.

The global water debacle is just as much a water management crisis as it is a naturally occurring issue, experts in the field agreed on Wednesday.

Water professionals had gathered to discuss the reasons behind the world's ever-dwindling water supply on Wednesday afternoon during a panel discussion at Tel Aviv University prior to Israel's first screening of the film Last Call at the Oasis.

Abrupt changes in the water cycle are occurring all over the world, with more precipitation, more evaporation and more river runoff globally, said Prof. James Famiglietti, director of the Hydrologic Modeling Center at the University of California – Irvine.

While such turns of events may "sound like a good thing," Famiglietti explained.

"The reality is actually much more grim, featuring short, intense bursts of precipitation and floods alternating with droughts."

In the meantime, groundwater levels all over the world are dropping dramatically.

"It's both a real water crisis and a management crisis as well, on many levels," he said.

"But part of it is the need to deal with this changing hydrology."

Compiling data through his Gravity Recovery and Climate Experiment satellite mission, Famiglietti has detected rampant declines in water masses all over the world.

"The picture that emerges is one of a very profound human fingerprint on the water landscape," he said. "When you look at this map of water storage changes, water availability around the world, the thing that really pops up most is the groundwater depletion that is happening all over the world."

This phenomenon includes both California and Israel, he said.



Agreeing with Famiglietti that the entire world is plagued by this alarming trend, Prof. Pinhas Alpert, head of Tel Aviv University's Porter School of Environmental Studies, connected the observations with what he called "the two GWs" – global warming and groundwater.

Both, he explained, are impacted by natural cyclical water changes and human management.

"What comes to my mind, I'm talking about the human fingerprint. We sometimes forget that both GWs are human fingerprints," Alpert said.

"Global warming is a human fingerprint due to greenhouse gases, and the other is due to direct use of groundwater."

In the eastern Mediterranean, issues of water management are particularly evident.

Israel is now more secure in this regard while the Palestinian Authority, Jordan and Cyprus all suffer from a different situation, explained Gidon Bromberg, Israel director of Friends of the Earth Middle East.

The management issue has become so problematic in the PA that Bromberg said he takes pains to use the toilet before leaving for his organization's Bethlehem office.

"There's a 50-50 chance there will be water in the office," he said. "Water scarcity around us is very much a reality.

And from our experience, management is a crucial issue."

Likewise, he spoke about a school on the Jordanian side of the Jordan Valley that formerly received water only four out of six operating days per week because the authorities were prioritizing agriculture. This, however, led to a situation in which parents were not sending their female children to school two days a week.

"Today the school gets water," Bromberg said. "It was a management issue, a policy issue of how to allocate priorities."



While the experts all agreed that management failures are exacerbating the ongoing water crisis, they said there was not one sole solution to tackling this predicament.

"There is no one thing that we can do that will solve our crisis of scarcity and management – it really is a combination of many things," Famiglietti said. "We simply cannot sustain a supply of naturally fresh water for moving forward, with our population growth and the groundwater depletion we are already experiencing."

Some solutions, he explained, will include increased water recycling and reuse, as well as more effective pricing mechanisms.

Following the panel discussion, the audience viewed the Israeli premiere of the 2011 film Last Call at the Oasis, directed by Jessica Yu and featuring Erin Brokovich-Ellis.

Taking a detailed look at troubled water spots around the world, the film focuses particularly on areas around the United States that are facing either water depletion or water contamination problems.

Appearing throughout as an expert commentator is Famiglietti.

The movie's conclusion, which looked at positive human steps toward water management, aired an interview with Bromberg and his colleagues at Friends of the Earth Middle East.

"The experience of [Friends of the Earth] comes to portray that things can be different and that the Middle East can be an example that, because of necessity, we can work together and see improvements on the ground," Bromberg said.

"Water crisis as much about management as nature", Jerusalem Post, 25/02/2013, online at: http://mideastenvironment.apps01.yorku.ca/?p=6888

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***** UC-Irvine researchers excited by Israel's water management

We are accustomed to hearing bad news from UC Irvine. Last year, UC Irvine's student senate voted to join the ranks of the BDS (a.k.a. Bigotry and Double Standards) movement. UC Irvine allowed a group of hate-filled hooligans to repeatedly and aggressively attempting to silence Amb. Michael Oren.

Today, the news is of a very different kind.

A group of Irvine water researchers is visiting the region, exploring opportunities to share knowledge and to collaborate. I should say, first of all, that being water researchers, these visitors adhere to a point of view that is progressive and environmentally focused. For them, the water shortages in the middle east and around the world are looming crises that must be addressed soon in order to stave off disaster. They recently published a study on water losses in Turkey, Syria, Iraq and Iran over the years from 2003 to 2009. The researchers were invited to Israel by Friends of the Earth - Middle East.

In National Geographic Water Currents, Prof. James Famiglietti, director of the Hydrologic Modeling Center at the University of California – Irvine comments on their recent visit to the Technion.

Technion University was our first stop on this water journey,, where we met with researchers at the Grand Water Research Institute (GWRI). During our conversation at Technion, we learned about the Israeli tools to allocate, reuse, and distribute water and how academic research improves these tools. Israel's water monitoring and allocation system is phenomenal – every drop of water, from freshwater resources to desalinated water, is accounted for, priced accordingly, and delivered to the end-user.

For we Californians, it was surprising and inspiring to hear about the innovative strategies in place to meet agricultural water demands and, even more so, that the farmers were completely in support of these policies. ...

As our discussions at Technion illustrated, the support for such innovative management policies begins with knowledge transfer to stakeholders. For example, the Israeli Ministry of Agriculture hosts annual meetings that farmers, academics, and decision makers attend with the goal of sharing their respective water experiences and to work toward more efficient water practices. A core aspect of that effective communication is creating practical, actionable results rooted in technical research. During our discussion at Technion, we repeatedly heard an emphasis on interdisciplinary research, bringing together economists, engineers, hydrologists, and politicians to guide those actionable results for water management. Technion is one of many universities that are part of the Middle East North Africa (MENA)Water Centers for Excellence project, sponsored by USAID. This platform provides the foundation forcollaboration between researchers throughout the MENA region including in Israel, the Palestinian Authority, and Jordan.



The concept of a "water research network" is lacking in the United States, as is the connection between researchers and decision-makers at the local, state, and national levels. In Israel, this model of collaboration has resulted in meticulous monitoring of water resources to inform water management policies and the subsequent support from all stakeholders. If we could shift our water management paradigm in the United States to effectively link researchers, policy-makers, and local stakeholders with open lines of communication, the outcome could be groundbreaking.

Our meeting at the GWRI at the Technion left us with many ideas for potential collaboration between our research center at UC Irvine and the Technion. On a technical level, we discussed a wide variety of potential research topics, ranging from the development of a 3D groundwater model; the evaluation of the linkages between water and soil management at a global scale; the use of enviromatics to better manage and monitor regional water systems; and optimization of land-surface and water management models to better reflect the reality of water demand and supply. On a broader level, our meeting provided a glimpse at new strategies and tools that we, in California, can use to more effectively manage water resources, link stakeholders, communicate knowledge, and develop policies to sustainably manage our resources.

This Israel-California knowledge transfer model is an exciting venture, and we hope that over the duration of our trip we will find more ideas, collaboration opportunities, and links with civil society, academic, and governmental agencies.

Universities and researchers around the world need to reject bigotry, double standards and lies, and instead actively support collaboration with Israeli researchers. They do not need to do this for the sake of Israel; rather, they should do it for the sake of their own societies.

"UC-Irvine researchers excited by Israel's water management", 28/02/2013, online at: <u>http://elderofziyon.blogspot.com/2013/02/uc-irvine-researchers-excited-</u> <u>by.html?utm_source=twitterfeed&utm_medium=twitter&utm_campaign=Feed%3A+blogspot%2FPDbq+(Elder+of+Ziyo</u> <u>n)</u>

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More funds needed to fight Litani pollution

BEIRUT: The proposed plan for the comprehensive treatment of pollution that has hit the upper Litani basin requires financial support from the government and international donors, ministers said during a seminar organized by the United Nations Development Program Thursday.

The seminar discussed the adoption of a plan that would utilize the best methods to combat pollution in the Litani River.

Environment Minister Nazim Khoury said LL342.5 billion was required to start the project in order to begin benefiting from one of the country's biggest natural resources.

The Litani River, which falls entirely within Lebanon and empties in the Mediterranean Sea, has seen a number of projects proposed and implemented over the past six decades.

The Litani River Authority, an independent agency, was established in 1954 to oversee the development of the Litani basin.

Increasing pollution has endangered the river's resources following the country's 15-year Civil War.

"This plan has been made with the agreement of all sides [ministries] involved in the project. What remains now is to get the blessing for the plan by ensuring it is financed either by the Cabinet, Parliament or by donors," Khoury said.

Interior Minister Marwan Charbel said that municipalities throughout the country could also help in the project to combat pollution in the Litani River if they were given the financial assets they were entitled to.

"There is LL1.3 billion in funds at the Telecommunications Ministry allocated for municipalities. We can allocate LL400 million from those funds to building dams," Charbel said.

Speaking on behalf of Speaker Nabih Berri, Health Minister Ali Hasan Khalil said Lebanon should preserve its water resources because wars in the future would be fought over access to water.

"More funds needed to fight Litani pollution", Daily Star, 25/02/2013, online at: http://mideastenvironment.apps01.yorku.ca/?p=6868

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* MK: Israel's Water Guaranteed 'Chametz-Free'

Israelis will again drink underground "well water" this Passover, because of fears that the Kinneret may contain chametz.

Israelis may not realize it, but duringPassover, their water comes not from the Kinneret, but from underground wells. "It has been like this for years, and will continue this year," said MK Moshe Gafni (United Torah Judaism).

In a letter to Gafni, Alexander Kushnir, the chairman of the Israel Water Authority, said that this year, as in years past, the Authority would stop pumping water from the Kinneret into the National Water Carrier three days before Passover. Instead, the Authority will pump water from underground wells into the water system.

In a request to Kushnir for clarification on the matter, Gafni said that in the past, many Israelis did not drink water from the tap out of fear that it contained chametz, the leavened material that is forbidden for consumption by Jews on Passover. "The fear is that chametz could be present because the Kinneret is an open body of water." Pumping water from the underground wells, where it was far less likely that bread of other chametz could reach, was acceptable to everyone, Gafni said.

The Kinneret will "rest" throughout the holiday. Pumping of water from the large fresh water lake, via the National Water Carrier, will begin after Passover has passed.

"MK: Israel's Water Guaranteed 'Chametz-Free'", 03/03/2013, online at: http://www.israelnationalnews.com/News/News.aspx/165830#.UTWqm6JPgj1

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More Dead Than Red

This is the first of a two-part report on environmental and political issues over the proposal to feed the Dead Sea with water from the Red Sea.

EIN GEDI, Israel, Feb 25 2013 (IPS) - The World Bank has declared the Red Sea-Dead Sea canal project feasible. Designed to "save the Dead Sea", "desalinate water and/or generate hydroelectricity at affordable prices in Jordan, Israel and the Palestinian Authority", and "build a symbol of peace in the Middle East", the scheme, green groups warn, is fraught with environmental hazards.

Currently at 426m below sea level, the Dead Sea, Earth's lowest elevation on land, is drying and dying in the desert by roughly 1.1 metres a year. Its surface area has shrunk by a third during the last 50 years from 960 square kilometres to 620 square kilometres.

Set along the Great Rift Valley between the biblical Moab plateau and Judaean desert, the hypersaline desert lake borders Jordan to the east, Israel and the nascent Palestinian state to the west.

As the world's most buoyant lake, the Sea is a natural spa. Its minerals have been extracted for treatment of skin diseases since the times of Cleopatra. Today, the chemicals industry is a multibillion dollar operation, with the Israeli Dead Sea Works and the Jordanian Arab Potash Company exploiting the water as raw material.

The total inflow to the Dead Sea has reduced from 1.25 billion cubic metres a year to 260 million cubic metres a year within 60 years as a result of the diversion of water for agriculture from the Jordan River, its main tributary to the north.

Add to that a changing climate and the Sea is an ever receding horizon trapped in a man-induced dead zone. Route 90 used to wind its way along it. Now the shore is over a kilometre away.

Over 300 square kilometres of seabed have been exposed since the 1960s with some five square kilometres a year currently being exposed.

Bared mudflats have thus caved in without warning, and led to the formation of over 3,000 sinkholes which slowly swallow land, roads, buildings; posing a significant hazard to agricultural, industrial, and touristic infrastructures.

No wonder then that the three waterside neighbours failed last year to have the Dead Sea crowned as one of the Seven Wonders of Nature, and the probability of having the Dead Sea listed as a World Heritage Site is a sinking dream.

"We don't want the Dead Sea to die; we want to revive it," Israel's minister for regional development Silvan Shalom tells IPS. "That's our main goal – to bring more water to an arid region. The best option is a canal to pump 2 cubic billion metres a year from the Red Sea."



What could save the Dead Sea from death foretold is a 180-km development project called the 'Red Sea-Dead Sea Water Conveyance'.

This is how it would work: marine water would be pumped from the Red Sea. A pipeline conveyance system with six pipes and a tunnel would then flow the water by gravity, exploiting the difference in elevation at and below sea level, to a high-level desalination plant and two hydroelectric plants.

The high-salinity brine reject would be discharged to the Dead Sea to halt and, eventually, reverse its decline.

After a decade-long argument, the World Bank released a series of studies last month which deem the proposed 'Red-Dead Canal' (as the ambitious scheme is dubbed) technically, environmentally and socio-economically feasible.

The main objectives would thus be fulfilled, the World Bank assesses. All that for a total capital cost of 9.97 billion dollars, the World Bank estimates; half of it amortised by selling desalinated water and hydroelectricity, the other half financed out of international aid to development – "a win-win situation," hails Shalom.

"The project doesn't hold water," counters Gidon Bromberg, director of Friends of the Earth Middle East-Israel (FoEME-Israel), a unique NGO which brings together Israeli, Jordanian and Palestinian eco-peace activists.

"The mixing of the Red Sea marine water with the unique brine of the Dead Sea is likely to lead to gypsum (a sedimentary deposit) excretions, to red algae bloom and will slime the water's purity. The two bodies of water won't mix, like oil and water. The Red Sea water will float on top."

Indeed, World Bank experts note that massive intakes of Red Sea water might durably whiten the otherwise royal blue colour of the Dead Sea, but that "this problem could be mitigated by adding gypsum crystals at the discharge location allowing a faster sedimentation of the precipitated gypsum."

Another concern lies with contamination of groundwater resulting from potential leakage of seawater while operating the pipeline conveyance system along the Arava Valley, an area classified as a "highly active seismic zone".

"Pipes could explode in the midst of an earthquake, and we'd see millions of cubic metres of water polluting groundwater," Bromberg tells IPS.

The World Bank suggests special arrangements like concrete boxes enclosing the pipes, isolation valves, and wave joints. A control system will close the valves in case of seismic stress on the pipes.



WATER RESEARCH PROGRAMME -Weekly Bulletin-

Addressing the fear that the pumping station might impact on the Red Sea coral reef, a modelling study commissioned by the Word Bank recommends that the intake be located at a depth of at least 140 metres. "The deeper the intake the less likely will be the impact."

"There were many hearings and these redundant arguments were rejected by the World Bank. Green groups don't want the project no matter what, that's the bottom line," says Shalom.

Prior to issuing a final report, the World Bank is currently holding a last series of hearings in Israel, Palestine and Jordan.

If the project is endorsed by the World Bank, intergovernmental negotiations will decide on how best to proceed. "There'll be a need to obtain finances, from our respective governments, from the World Bank itself, or from the private sector," Shalom clarifies.

"Then, tenders will be issued, contracts awarded for the design, procurement and construction of the canal. This should be discussed between the parties."

The World Bank's forecast is that the canal could be built within six years and start operating in 2020, reaching its maturity stage by 2060.

"More Dead Than Red", 25/02/2013, online at: http://www.ipsnews.net/2013/02/more-dead-than-red/

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Environmental concerns reach fever pitch over plan to link Red Sea to Dead Sea Controversies linger over the project's impact and the status of the Palestinian Authority.

An ambitious plan to build a pipeline to carry water from the Red Sea to the shrinking Dead Sea lurched forward this month, after the World Bank held hearings to gather public comments on the proposal. But environmentalists charge that alternative plans to save the Dead Sea would be cheaper, more flexible and would have less impact on the region's ecosystems.

If the project proceeds, a 180-kilometre buried pipeline will carry up to 2 billion cubic metres (m³) of sea water per year from the Gulf of Aqaba on the Red Sea through Jordanian territory to the Dead Sea.

The Dead Sea is world's lowest inland area. Proposals have been put forward to set up the pipeline so that the downward flow of the water goes through a hydroelectric plant that would in turn power a desalination plant, providing up to 850 million m³ of fresh water per year to the parched region. Brine from the desalination plant would be discharged into the already-saline Dead Sea, replenishing water that is evaporating from the lake at a rate of more than 1 metre per year.

The estimated cost of the project would be at least US\$10 billion, of which about \$2 billion would be for facilities that would pump the desalinated water from the Dead Sea towards Amman — a distance of 200 kilometres, and a difference in altitude of 1,000 metres.

The World Bank in the past two weeks held public forums on the proposal in six cities across the three regions affected by the plan: Amman and Aqaba in Jordan; Eilat and Jerusalem in Israel; and Ramallah and Jericho in the Occupied Palestinian Territories. The meetings came after the publication last year of three major reports — a feasibility study¹, an environmental and social assessment² and a study of alternatives³ to the controversial project.

Alex McPhail, team leader for the World Bank's Red Sea–Dead Sea study programme, presented the three reports at the cacophonous Jerusalem hearing. McPhail said that the environmental and social assessment, led by the Environmental Resources Management, an international consultancy, indicates



that "all potential major environmental and social impacts can be mitigated to acceptable levels" — with one notable exception.

Studies indicate that if more than 400 million m³ of sea water is added to the Dead Sea, the body of water could be afflicted with algal blooms or the formation of gypsum crystals, with effects that could be difficult to predict. But that amount of water or more is needed to stabilize or raise the level of the Dead Sea.

The environmental outcome of mixing Red Sea water into the Dead Sea is one of the project's biggest stumbling blocks, according to the conduit's biggest opponent, Friends of the Earth Middle East (FoEME), which is headquartered in Amman.

Ways to water

FoEME favours exploring alternative ways of getting drinking water to the region and saving the Dead Sea. These include increasing water recycling and conservation by Israel and Jordan; importing water from Turkey; and desalinating sea water on the shores of the Mediterranean Sea or at Aqaba, then discharging the brine into the Dead Sea and pumping the fresh water directly to Amman.

Pumping desalinated Mediterranean sea water across Israel to Amman "almost certainly would be cheaper" than pumping it across Jordanian territory, says David Meehan, team leader for the feasibility study. "But my perception is that it would be hugely unpopular in Jordan. Basically Israel would control the tap on the water supply to Amman."

Jordan is a strong proponent of the Red–Dead project, mainly because per capita, the country's access to fresh water is among the most restricted in the world. Saad Abu Hammour, secretary-general of the Jordan Valley Authority, told the Jerusalem hearing that the scarcity of water in Jordan has been exacerbated by the arrival of more than 250,000 Syrian refugees into the country since the outbreak of the Syrian civil war in 2011.



International tensions

Raising money for the pipeline may pose a problem at a time when many governments around the world are imposing austerity measures.

But an even more formidable obstacle may prove to be the region's politics, says Gidon Bromberg, director of FoEME in Israel. The project's progress depends on all three parties signing a treaty, but Bromberg wonders whether the Israeli government is prepared to enter a treaty with the Palestinian Authority.

"A treaty means political recognition to sovereignty rights around the Dead Sea," he says. "They got away with it in the interim by calling everyone 'beneficiaries'. The Palestinians aren't going to accept that. But even more importantly, the international community isn't going to accept that. So noone is going to give money unless you have a treaty in place."

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✤ Israeli forces destroy water supply network south of Jenin

Israeli occupation forces have destroyed the water network that supplies the village of Meriha, south of Jenin. The destruction took place while the Israelis were using bulldozers to block roads used by farmers and other local people in the area, especially the residents of Ya'bad.

The head of Ya'bad local council, Samer Abu Bakr, told the local media that the bulldozers destroyed the main water pipeline supplying Meriha's 500 residents with fresh water. Abu Bakr pointed out that the pipeline is maintained by his municipality and its destruction has left Meriha's villagers without water.

He noted out that the Israeli occupation forces are very aggressive against the town and its residents: "They occupy homes, establish check points, close roads and destroy the infrastructure." Bulldozers protected by Israeli soldiers have closed minor roads leading into the town, as well as the Western entrances to Meriha and Tulkarem, he added.

Israel prevents Palestinian farmers from getting to their fields on the plains of Ya'bad and Arrabe on the pretext that stones are thrown at illegal settlers and their cars. The settlement of Mevo Dotan is in the same area. All of Israel's settlement-colonies are illegal under international law.

"Israeli forces destroy water supply network south of Jenin ", 28/02/2013, online at: http://www.middleeastmonitor.com/news/middle-east/5356-israeli-forces-destroy-water-supply-network-south-of-jenin

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✤ 93% of Disi project completed

Capital's infrastructure ready to receive water from southern aquifer

AMMAN — The capital's infrastructure is ready to receive water from the Disi Water Conveyance Project, 93 per cent of which has been completed, according to a government official.

Thirty-three out of a total of 55 wells for pumping water from the Disi aquifer have been drilled, according to Basem Tulfah, secretary general of the Ministry of Water and Irrigation and acting secretary general of the Water Authority of Jordan.

"The project is progressing according to schedule and water from the Disi aquifer is expected to reach Amman in July this year under the agreement signed between the government and GAMA, the Turkish company implementing the project," Tulfah told reporters.

The Disi project, work on which started in 2007, entails drilling 64 wells, 55 of which will be used for the generation of water, while nine will serve as piezometer wells to measure the elevation of water.

Being carried out on a build-operate-transfer basis, the Disi project seeks to provide the capital with 110 million cubic metres of water annually via a 340-kilometre pipeline, which will convey water from the southern region to the capital, passing through several water stations in Maan, Tafileh, Karak and Madaba.

The project is viewed as the Kingdom's first step towards achieving water security, according to ministry officials, who said the water supply to Amman and Zarqa, 22km east of the capital, among other governorates is expected to improve.

"Once the Disi project is operational, households in the capital will start receiving water three times a week instead of once under the water distribution programme. Later, supply is expected to become constant," Tulfah said.

Under the current distribution programme, households in Jordan receive water once during a set period, usually a week to 10 days, on a rotating basis. Scarce water resources in the country compelled the Kingdom to initiate the programme in the early 1980s to conserve limited resources and ensure a sustainable water supply for subscribers.

"93% of Disi project completed", Jordan Times, 01/03/2013, online at: http://mideastenvironment.apps01.yorku.ca/?p=6894

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✤ Parallel Worlds: Water Management in Israel and California

As we left the Ben Gurion-Tel Aviv airport, my colleagues and I excitedly scanned the new landscape that surrounded us. Our first impression was how incredibly familiar it felt to California. A field of orange trees, perfect rows of irrigated crops, a salty breeze from the Mediterranean Sea. Maybe we were just hyper-aware of our surroundings, looking to find parallels between our home and this new region, but the reality is that Israel and California share a striking similarity in their physical environments and, subsequently, their challenges to manage water resources.

The Israel-California Water Link

This core connection between California and the Middle East, particularly Israel, was one motivation for our trip. The other was the release of our <u>recent paper on groundwater depletion in the Tigris-Euphrates-Western Iran region</u>. It is a well-known fact that this entire region faces extreme challenges to manage their scarce water resources. Drought, increasing agricultural water demand, population pressures, and competing stakeholders add to an already stressed water system. Despite these challenges, this region is at the forefront of water management. The regional efforts to collaboratively manage surface water resources from the Jordan River and groundwater aquifers, for example by <u>Friends of the Earth Middle East</u>, as well as Israel's strategies to maximize and efficiently use every last drop of water, are revolutionary.

In Israel, wastewater from urban areas is used to irrigate nearly 100% of crops in a desert while desalination accounts for 60% of water supply in densely populated regions. Pricing for water accurately reflects the costs to transport and produce the water, but these prices are affordable for all. Crops that can be grown with "poor quality" water, such as brackish or reclaimed wastewater, are cultivated while water-intensive agriculture and flood irrigation is rejected. Greenhouses and drip irrigation systems dominate the irrigation landscape. Clearly, the world, and including California, could learn a thing or two from Israel.

Over the course of our two weeks in the Middle East, we will meet with the key water authorities, water utility companies, civil society members, and university researchers in Israel, Palestinian



territories, and Jordan. During our "science diplomacy" trip, we hope to not only share our research, but to learn from a region that is a prototype for effective water management.

Lessons from Technion University

<u>Technion University</u> was our first stop on this water journey, where we met with researchers at the <u>Grand Water Research Institute (GWRI)</u>. During our conversation at Technion, we learned about the Israeli tools to allocate, reuse, and distribute water and how academic research improves these tools. Israel's water monitoring and allocation system is phenomenal – every drop of water, from freshwater resources to desalinated water, is accounted for, priced accordingly, and delivered to the end-user. Although agriculture has the largest demand for freshwater resources, the government water policy restricts the freshwater allocation to approximately 0.450 km³ and not a drop more. The residual agricultural water demand is fulfilled by Israel's extensive recycled wastewater and brackish water distribution system. The other major end-user, domestic water demand, is met by desalination, surface water from the Sea of Galilee, freshwater rivers and aquifer supplies.

For we Californians, it was surprising and inspiring to hear about the innovative strategies in place to meet agricultural water demands and, even more so, that the farmers were completely in support of these policies. In the States, we have very little monitoring of agricultural water use, particularly of groundwater abstraction. If groundwater were as closely allocated and monitored in the U. S. as the resources are in Israel, the monitoring may be regarded as a breach of personal freedoms, since groundwater rights are tied to property rights in much of the country. Yet here in Israel, the farmers have fully supported this progressive strategy to both strictly monitor and allocate water resources and to introduce new supplies through desalination and recycled water. Much of their support appears to be the result of an ongoing communication and social outreach initiative to inform farmers about the limits to water resources and the opportunities to meet water demands through more sustainable practices. How could we drive a shift in the United States to emulate this support for innovative water management policies?

As our discussions at Technion illustrated, the support for such innovative management policies begins with knowledge transfer to stakeholders. For example, the Israeli Ministry of Agriculture hosts annual meetings that farmers, academics, and decision makers attend with the goal of sharing their respective water experiences and to work toward more efficient water practices. A core aspect



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of that effective communication is creating practical, actionable results rooted in technical research. During our discussion at Technion, we repeatedly heard an emphasis on interdisciplinary research, bringing together economists, engineers, hydrologists, and politicians to guide those actionable results for water management. Technion is one of many universities that are part of the <u>Middle East</u> <u>North Africa (MENA) Water Centers for Excellence project</u>, sponsored by USAID. This platform provides the foundation for collaboration between researchers throughout the MENA region including in Israel, the Palestinian Authority, and Jordan.

The concept of a "water research network" is lacking in the United States, as is the connection between researchers and decision-makers at the local, state, and national levels. In Israel, this model of collaboration has resulted in meticulous monitoring of water resources to inform water management policies and the subsequent support from all stakeholders. If we could shift our water management paradigm in the United States to effectively link researchers, policy-makers, and local stakeholders with open lines of communication, the outcome could be groundbreaking.

Collaborating for a Sustainable Water Future

Our meeting at the GWRI at the Technion left us with many ideas for potential collaboration between our research center at UC Irvine and the Technion. On a technical level, we discussed a wide variety of potential research topics, ranging from the development of a 3D groundwater model; the evaluation of the linkages between water and soil management at a global scale; the use of enviromatics to better manage and monitor regional water systems; and optimization of land-surface and water management models to better reflect the reality of water demand and supply. On a broader level, our meeting provided a glimpse at new strategies and tools that we, in California, can use to more effectively manage water resources, link stakeholders, communicate knowledge, and develop policies to sustainably manage our resources.

This Israel-California knowledge transfer model is an exciting venture, and we hope that over the duration of our trip we will find more ideas, collaboration opportunities, and links with civil society, academic, and governmental agencies. From domestic water use strategies to effective agricultural irrigation and high-tech water system modeling to the development of innovative distribution systems, the possibilities for international learning are endless. In the next few posts, you'll hear about our conversations with key civil society leaders, such as Friends of the Earth Middle East, and



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regional water managers in Israel, Palestine, and Jordan as well as our insights to the region's water initiatives, such as the proposed <u>Red Sea-Dead Sea</u> conduit. With this new cross-regional network as a foundation, our water future is looking brighte

"Parallel Worlds: Water Management in Israel and California", 27/02/2013, online at: http://newswatch.nationalgeographic.com/2013/02/27/parallel-worlds-water-management-in-israel-and-california/

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✤ Pakistan launches first national climate change policy

NEW DELHI (AlertNet) - Disaster-prone Pakistan has launched its <u>first ever national policy</u> on climate change, detailing how it plans to tackle the challenges posed by global warming, mitigate its risks and adapt key sectors of the country's economy to cope with its consequences.

Pakistan is highly vulnerable to weather-related disasters such as cyclones, droughts, floods, landslides and avalanches. Devastating floods in 2010 disrupted the lives of 20 million people – many more than the 2004 Indian Ocean tsunami – and cost \$10 billion.

The climate change policy, developed with the support of the United Nations Development Programme (UNDP), recommends some 120 steps the country could take to slow down the impact of global warming, as well as adapt sectors such as energy, transport and agriculture.

Measures include flood forecasting warning systems, local rainwater harvesting, developing new varieties of resilient crops, promoting renewable energy sources and more efficient public transport.

"The National Climate Change policy takes into account risks and vulnerabilities of various development sectors with specific emphasis on water, food, energy and national security issues," said Rana Mohammad Farooq Saeed Khan, Minister for Climate Change <u>at the launch of the policy in</u> <u>Islamabad on Tuesday</u>.

But the policy needs a concrete action plan to back it up, with details, budgets and timelines first, **<u>some newspaper commentators said</u>**, adding that only then could there be a chance of effective implementation.

Questions have also arisen about where the money to fund implementation will come from and whether Pakistan's provinces have the capacity and expertise to put it in place.

Last year, a major U.N. report said the world needed to prepare better to deal with extreme weather and rising seas caused by climate change, in order to save lives and limit deepening economic losses.



UNDP's Pakistan Director Marc-André Franche said addressing changing weather patterns would help the country's economic development.

"Pakistan is among the most vulnerable countries facing climate risks and mechanisms need to be devised for greener, more resilient options for growth and sustainable development, said Franche at the launch.

"I hope the policy will help key stakeholders in identifying capacities and skills for the successful implementation of the policy," he added.

"Pakistan launches first national climate change policy", 01/03/2013, online at: http://www.trust.org/alertnet/news/pakistan-launches-first-national-climate-changepolicy/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=9b20c02ce6-RSS_EMAIL_CAMPAIGN&utm_medium=email

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✤ 'Bihar opposed to Centre's water policy

PATNA: Water resources department minister Vijay Kumar Choudhary on Friday informed the state assembly about the harmful implications of the Centre's move to control the water resources of the state through its National Water Law Framework (NWLF) that is under preparation as part of the already adopted National Water Policy (NWP), 2012. He said NWLF would adversely impact the per capita availability of water per year in the state.

Choudhary said a grim scenario has been developing in the state, as the availability of surface and underground water had started bordering around the "water scarcity" category. An area is categorized as "water scarcity" zone if its per capita availability of water per year is less than 1,000 cubic metre per person, he added.

The purpose of NWLF is to vest the Centre with power to "control" water resources of Bihar and other states for "equity" in implementation of schemes and for "distribution" of water resources as it deems suitable, even as water falls exclusively in the state list as per the provisions of the Constitution, he added.

"The state government is strongly opposed both to the policy prescriptions in NWP-2012 and to devising of the NWLF because the Centre's move not only amounts to interference with the rights of Bihar to control its water resources, but also militates against the federal structure with regard to state's ownership of water resources as well as with its right to free use and distribution," Choudhary said.

He said this while giving the government's reply to the <u>House</u> debate on his department's budgetary demand worth Rs 3,319 crore for 2013-14. Though a cut motion had been moved by Independent MLA Jyoti Rashmi. the House passed the budget by voice vote.

According to Choudhary, Bihar is faced with fast depletion of water resources. The per capita availability of water per person per year in Bihar was 1,200 cubic metre against the national average of 1,545 cubic metre in 2011. An area is categorized as "water stressed" if the per capita per year availability of water is in the range of 1,700-1,000 cubic metres, Choudhary added.

"Bihar opposed to Centre's water policy", 02/03/2013, online at: <u>http://articles.timesofindia.indiatimes.com/2013-03-</u>02/patna/37389380 1 water-resources-water-scarcity-capita-availability

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* Hydropower projects intimidate Mekong Delta

VietNamNet Bridge – The upper reaches of the Mekong River are now seeing the operation of 100 out of 300 hydropower projects, which scientists warn of a threat to the Mekong Delta.

Dr. Chu Thai Hoanh, from the International Water Management Institute (IWMI), said that hydropower dams which have been built in the upper reaches of the Mekong River will accumulate up to 16 percent of the river's water volume, or about 475 billion cubic meters of water a year. Several international organizations and scientists have objected to 12 hydropower projects on the Mekong River. If they are built, about 55 percent of the river's length will be dammed up for reservoirs. This will greatly affect agricultural production in the Mekong River Commission, Vietnam's agriculture and seafood production will suffer much damage. Silt deposit will fall from the current 26 million tons to only seven million tons a year and riverside landslide will run worse. Seafood industry will undergo US\$1 billion damage yearly due to reduction of white fish species,

accounting for 65 percent of fish in the Mekong River. White fish is the main food for the remaining of 35 black fish species.

About 14 million farmers whose life depends on agriculture and seafood production will be badly affected.

Le Anh Tuan, from the Research Institute for Climate Change under Can Tho University, said that if climate change and hydropower development keep progressing, Vietnam will not be a food export country any longer.

There will have waves of mass emigration which may cause unpredictable socio-economic consequences, he said.

"Hydropower projects intimidate Mekong Delta", 25/03/2013, online at: <u>http://english.vietnamnet.vn/fms/environment/66759/hydropower-projects-intimidate-mekong-delta.html</u>

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✤ Biggest Robusta Harvest at Risk as Vietnam Suffers Drought

The coffee harvest in <u>Vietnam</u>, the biggest grower of the robusta variety, may decline in the 2013-2014 season as a drought in the country's top producing region may lead to smaller fruits, potentially boosting prices.

Water levels in reservoirs, rivers and streams in the Central Highlands are much lower due to less rainfall last year, Nguyen Dai Nguong, the head of Dak Lak Meteorology and Hydrology Department, said yesterday. Dry conditions are expected to continue this month as the probability of off-season rains is much less than in previous years, he said. The highlands cover five coffee-growing provinces, including Dak Lak, which alone represents about a third of Vietnam's total production. A smaller crop in the country may boost robusta prices for a second year. Rising consumption in Indonesia will cut supplies from the third-largest robusta grower, a Bloomberg survey showed. The global coffee market may swing to a deficit as output drops in Vietnam and Brazil, the top producer of the more expensive arabica variety, according to Hackett Financial Advisors Inc. Arabica beans are brewed by specialty companies including <u>Starbucks Corp. (SBUX)</u>, and robusta by<u>Nestle SA (NESN)</u> for instant drinks.

"Looking at low water levels at reservoirs, I can see the risk that the next crop will decline sharply," Cao Van Tu, chairman of Dak Lak-based Ea Pok Coffee Co., said by phone yesterday. "Insufficient water will hurt the development of fruits and they may be smaller."

Shrinking Discount

Robusta for May delivery fell 0.1 percent to \$2,105 a metric ton at 12:44 p.m. on NYSE Liffe in London, for a gain of 9.4 percent this year. Prices climbed 6.3 percent in 2012 as some roasters increased consumption of the cheaper beans. Arabica for May delivery dropped 0.4 percent to \$1.4265 a pound on ICE Futures U.S. in <u>New York</u>. Robusta's <u>discount</u> to arabica was 47.07 cents a pound, down 17 percent this year.

Water levels at many reservoirs in Vietnam's central provinces are only at 20 percent to 50 percent of designed capacity, the government said on its website Feb. 26, warning the drought may hurt rice and coffee crops. Farmers irrigate crops by pumping water from reservoirs and wells before the rainy season starts in May.

Production in the country, where harvesting starts in October, probably dropped 15 percent to 1.41 million tons in 2012-2013 from a record 1.65 million tons a year earlier, according to the median of eight trader and shipper estimates compiled by Bloomberg in a survey published Feb. 1. Farmers may have sold 570,000 tons, or 40 percent of the harvest, less than the 45 percent sold a year earlier, the survey showed.

Price Advance

"The drought will add to farmers' reasons for holding back coffee sales," said Tran Tuyen Huan, Ho Chi Minh City-based general director of Asia Commodities Joint-Stock Co. "Any delays like that in the supply chain will certainly impact prices," he said, referring to the limiting of sales.



Farmers have probably sold 60 percent to 70 percent of the crop, Keith Flury, an analyst at Rabobank International in London, said in an e-mail yesterday.

Beans in <u>Dak Lak</u> climbed 1 percent to 42,300 dong (\$2.02) a kilogram (2.2 pounds) yesterday, extending their gains this year to 10 percent, <u>data</u> from the Daklak Trade & Tourism Center show. The average water level in rivers and streams in the last eight days of February was 0.5 meter to 0.7 meter lower than the same period last year, according to a report today from the meteorology and hydrology department. The average water level in the first 10 days of March is forecast to drop 0.3 meter to 0.5 meter from the same period a year ago, the department said.

Declining Supplies

The drought has prompted early irrigation, which may lead to an early harvest, Ea Pok Coffee's Tu said. If coffee is harvested in the rainy season, the quality will be affected, he said. Coffee trees in Vietnam usually flower and form fruits between January and March, according to growers. Exports from Indonesia may total 450,000 tons from a record harvest of 640,000 tons in the year starting April 1, according to the median of seven exporters' estimates compiled by Bloomberg. Local usage almost doubled in the past decade to 149,400 tons, according to the <u>U.S. Department of Agriculture</u>.

"The Vietnamese are selling less and have less to sell and exports out of Indonesia have not been too strong," Flury said in the e-mail. "Where is it all going to come from for the next six months?" The global coffee deficit may be 2 million bags of 60 kilograms (132 pounds) each from an estimated surplus of 9 million bags this season, <u>Shawn Hackett</u>, president of the <u>Boynton Beach</u>, Florida-based company, said Feb. 24. Coffee is the best bet in the soft-commodities segment, he said on Feb. 5.

"Biggest Robusta Harvest at Risk as Vietnam Suffers Drought", 01/03/2013, online at: http://www.bloomberg.com/news/2013-02-28/world-s-biggest-robusta-crop-at-risk-as-vietnam-suffersdrought.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=9b20c02ce6-RSS_EMAIL_CAMPAIGN&utm_medium=email

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Global warming may cause extremes by slowing "planetary waves"

(Reuters) - Global warming may have caused extreme events such as a 2011 drought in the United States and a 2003 heatwave in Europe by slowing vast, wave-like weather flows in the northern hemisphere, scientists said on Tuesday.

The study of meandering air systems that encircle the planet adds to understanding of extremes that have killed thousands of people and driven up food prices in the past decade.

Such planetary air flows, which suck warm air from the tropics when they swing north and draw cold air from the Arctic when they swing south, seem to be have slowed more often in recent summers and left some regions sweltering, they said.

"During several recent extreme weather events these planetary waves almost freeze in their tracks for weeks," wrote Vladimir Petoukhov, lead author of the study at the Potsdam Institute for Climate Impact Research in<u>Germany</u>.

"So instead of bringing in cool air after having brought warm air in before, the heat just stays," he said in a statement of the findings in the U.S. journal Proceedings of the National Academy of Sciences.

A difference in temperatures between the Arctic and areas to the south is usually the main driver of the wave flows, which typically stretch 2,500 and 4,000 km (1,550-2,500 miles) from crest to crest.

But a build-up of greenhouse gases in the atmosphere, blamed on human activities led by use of fossil fuels, is heating the Arctic faster than other regions and slowing the mechanism that drives the waves, the study suggested.

RUSSIA, PAKISTAN

Weather extremes in the past decade include a European heatwave in 2003 that may have killed 70,000 people, a Russian heatwave and flooding in <u>Pakistan</u> in 2010 and a 2011 heatwave in the United States, the authors added.

"Here, we propose a common mechanism" for the generation of waves linked to climate change, they wrote.



Past studies have linked such extremes to global warming but did not identify an underlying mechanism, said Hans Joachim Schellnhuber, director of the Potsdam Institute and a co-author.

"This is quite a breakthrough," he wrote. The scientists added that the 32-year-period studied was too short to predict future climate change and that natural variations in the climate had not been ruled out completely as a cause.

The study only considered the northern part of the globe, in summertime. Petoukhov led another study in 2010 suggesting that cold snaps in some recent winters in Europe were linked to low amounts of ice in the Arctic Ocean.

Almost 200 governments have agreed to work out by the end of 2015 a deal to combat rising global greenhouse gas emissions that will enter into force from 2020.

"Global warming may cause extremes by slowing "planetary waves"", 25/02/2013, online at: <u>http://www.reuters.com/article/2013/02/25/us-climate-waves-</u> idUSBRE91012Q20130225?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=1ece9e6e5d-RSS_EMAIL_CAMPAIGN&utm_medium=email

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Can top corporations develop needed water solutions?

What's one thing the Sisters of Mercy and the titans of Wall Street have in common? A deepening realization of water's fundamental value.

My colleague Berkley Adrio and I had a chance to witness this first hand this month in New York City, where on opposite sides of the city, we saw vexing questions about the nature of freshwater's value being debated by religious investors, mainstream asset managers, community activists and multinational corporations.

Downtown, Goldman Sachs co-sponsored an event, '*Water: Emerging Risks and Opportunities*', with GE and the <u>World Resources Institute</u>. Despite the winter mess outside, nearly 300 asset managers, water infrastructure and energy sector executives came to learn about opportunities for investing in water and the growing water demands of the United States' booming unconventional energy sector.

Uptown, the Interfaith Center for Corporate Responsibility – an organization with an impressive 40year track record of faith-based shareholder activism – convened a roundtable on the obligations of companies to respect the <u>human right to water</u>. Seventy religious investors, major water-intensive companies, and grassroots activists from around the globe came together to tackle the question of what companies can and should do to ensure their operations "do no harm" to water supplies of local communities.

Investors at the Goldman event who are allocating capital to "water solutions" very well may be driving the green technologies that can help the industrial companies at the ICCR session clean up their acts. But the problem for companies is that in most places, water is so cheap that investing in these solutions can sometimes be hard to justify on a traditional ROI basis, if not on a moral one. So what is water's worth? Your response depends on how we measure its "true" value. EPA's senior advisor on water, Ken Kopocis, warned the Goldman audience that this was <u>no easy exercise</u>: "Can you really give water a price? In a stream it's free, and when you don't have it…it's priceless."

Indeed, water is increasingly scarce and contested in many regions, including many parts of the United States. But according to traditional economic thinking, that scarcity should drive up the price of the good in question, and in turn moderate demand. But water is no ordinary good, and its price is



the function of messy, local political processes. In the U.S. for example, it tends to be cheapest where it's least abundant, including in desert communities in Utah, Nevada and California. In theory, "water markets" should help address this scarcity. As David Sunding, UC Berkeley water economist (and a reviewer of a <u>Ceres study</u> on water risk in the municipal bond market) noted at the Goldman event, there are "huge arbitrage opportunities" in water because different users pay vastly different amounts – i.e., farmers vs. residential users (a case in point is T. Boone Pickens selling in 2011 Ogallala aquifer water owned by Texas farmers for over \$100 million to a group of municipalities that were fast running out of surface supplies).

But while water trading is seemingly viable, the "reality on the ground has proven to be quite different," Sunding says. Why is that? Too many local rules and restrictions that make water trading cumbersome. But just as important are massive engineering challenges of moving heavy water long distances.

No one knows that better than Patricia Mulroy, head of the Southern Nevada Water Authority and a keynote at the Goldman event, who spent nearly \$2 billion to build a new intake pipe at water-starved Lake Mead and is seeking to spend billions more to pipe water 263 miles from eastern Nevada to Las Vegas.

As the person responsible for maintaining water security for the driest city in the country, Mulroy says the true value of water is about the cost of physically moving it. As she put it: "A human right to water? Sure. You come to me and I will tell you 'here's a bucket' – go to Lake Mead and take all you want. It's the hardware that isn't free."

In this world of growing scarcity, how do we balance the roles of pricing and governance for allocating a finite and essential resource?

At Ceres we are driving innovations in both of these arenas. We are working with the <u>University of</u> <u>North Carolina Environmental Finance Center</u> to identify the water utility rate structures that most effectively convey the scarcity of water while maintaining stable revenues and ensuring affordable access.

We're also working with large corporate water users like Coke, Suncor and Ford to help them identify opportunities to <u>improve their water stewardship</u> in their own operations and also play a more effective role in advocating for stronger governance of these limited resources in water-stressed regions.



WATER RESEARCH PROGRAMME -Weekly Bulletin-

The markets can be an effective tool for allocating scarce resources in most circumstances. However, markets without effective governance systems won't do the job of protecting the needs of the least able to pay and those of future generations.

"Can top corporations develop needed water solutions?", 26/02/2013, online at: <u>http://www.greenbiz.com/news/2013/02/26/can-ge-coke-others-develop-needed-water-solutions</u>

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* The Upcoming Water Shortage Crisis

Challenges and potential solutions to water shortages...

WATER is not scarce. It is made up of the first and third most common elements in the universe, and the two readily react to form a highly stable compound that maintains its integrity even at temperature extremes, *explains Alex Daley, chief technology investment strategist at Doug Casey's Casey Research*.

Hydrologist Dr. Vincent Kotwicki, in his paper Water in the Universe, writes:

"Water appears to be one of the most abundant molecules in the Universe. It dominates the environment of the Earth and is a main constituent of numerous planets, moons and comets. On a far greater scale, it possibly contributes to the so-called 'missing mass' [i.e., dark matter] of the Universe and may initiate the birth of stars inside the giant molecular clouds."

Oxygen has been found in the newly discovered "cooling flows" – heavy rains of gas that appear to be falling into galaxies from the space once thought empty surrounding them, giving rise to yet more water.

How much is out there? No one can even take a guess, since no one knows the composition of the dark matter that makes up as much as 90% of the mass of the universe. If comets, which are mostly ice, are a large constituent of dark matter, then, as Dr. Kotwicki writes, "the remote uncharted (albeit mostly frozen) oceans are truly unimaginably big."

Back home, Earth is often referred to as the "water planet," and it certainly looks that way from space. H2O covers about 70% of the surface of the globe. It makes all life as we know it possible.

However it got here – theories abound from outgassing of volcanic eruptions to deposits by passing comets and ancient crossed orbits – water is what gives our planet its lovely, unique blue tint, and there appears to be quite a lot of it.

That old axiom that the earth is 75% water... not quite. In reality, water constitutes only 0.07% of the earth by mass, or 0.4% by volume.



This is how much we have, depicted graphically:

What this shows is the relative size of our water supply if it were all gathered together into a ball and superimposed on the globe.

The large blob, centered over the western US, is all water (oceans, icecaps, glaciers, lakes, rivers, groundwater, and water in the atmosphere). It's a sphere about 860 miles in diameter, or roughly the distance from Salt Lake City to Topeka. The smaller sphere, over Kentucky, is the fresh water in the ground and in lakes, rivers, and swamps.

Now examine the image closely. See that last, tiny dot over Georgia? It's the fresh water in lakes and rivers.

Looked at another way, that ball of all the water in the world represents a total volume of about 332.5 million cubic miles. But of this, 321 million mi3, or 96.5%, is saline – great for fish, but undrinkable without the help of nature or some serious hardware. That still leaves a good bit of fresh water, some 11.6 million mi3, to play with. Unfortunately, the bulk of that is locked up in icecaps, glaciers, and permanent snow, or is too far underground to be accessible with today's technology. (The numbers come from the USGS; obviously, they are estimates and they change a bit every year, but they are accurate enough for our purposes.)

Accessible groundwater amounts to 5.614 million mi3, with 55% of that saline, leaving a little over 2.5 million mi3 of fresh groundwater. That translates to about 2.7 exa-gallons of fresh water, or about 2.7 billion billion gallons (yes billions of billions, or 1018 in scientific notation), which is about a third of a billion gallons of water per person. Enough to take a long shower every day for many lifetimes...

However, not all of that groundwater is easily or cheaply accessible. The truth is that the surface is the source for the vast majority – nearly 80% – of our water. Of surface waters, lakes hold 42,320 mi3, only a bit over half of which is fresh, and the world's rivers hold only 509 mi3 of fresh water, less than 2/10,000 of 1% of the planetary total.


And that's where the problem lies. In 2005 in the US alone, we humans used about 328 billion gallons of surface water per day, compared to about 83 billion gallons per day of water from the ground. Most of that surface water, by far, comes from rivers. Among these, one of the most important is the mighty Colorado.

Or perhaps we should say "the river formerly known as the mighty Colorado." That old Colorado – the one celebrated in centuries of American Western song and folklore; the one that exposed two billion years of geologic history in the awesome Grand Canyon – is gone. In its place is... well, Las Vegas – the world's gaudiest monument to hubristic human overreach, and a big neon sign advertising the predicament now faced by much of the world.

It's well to remember that most of the US west of the Mississippi ranges from relatively dry to very arid, to desert, to lifeless near-moonscapes. The number of people that could be supported by the land, especially in the Southwest, was always small and concentrated along the riverbanks. Tribal clusters died out with some regularity. And that's the way it would have remained, except for a bit of ingenuity that suddenly loosed two powerful forces on the area: electrical power, and an abundance of water that seemed as limitless as the sky.

In September of 1935, President Roosevelt dedicated the pinnacle of engineering technology up to that point: Hoover Dam. The dam did two things. It served as a massive hydroelectric generating plant, and it backed up the Colorado River behind it, creating Lake Mead, the largest reservoir in the country.

Early visitors dubbed Hoover Dam the "Eighth Wonder of the World," and it's easy to see why. It was built on a scale unlike anything before it. It's 725 feet high and contains 6 million tons of concrete, which would pave a road from New York to Los Angeles. Its 19 generators produce 2,080 MW of electricity, enough to power 1.75 million average homes.

The artificially created Lake Mead is 112 miles long, with a maximum depth of 590 feet. It has a surface area of 250 square miles and an active capacity of 16 million acre-feet.



Hoover Dam was intended to generate sufficient power and impound an ample amount of water, to meet any conceivable need. But as things turned out, grand as the dam is, it wasn't conceived grandly enough... because it is 35 miles from Las Vegas, Nevada.

Vegas had a permanent population in 1935 of 8,400, a number that swelled to 25,000 during the dam construction as workers raced in to take jobs that were scarce in the early Depression years. Those workers, primarily single men, needed something to do with their spare time, so the Nevada state legislature legalized gambling in 1931. Modern Vegas was born.

The rise of Vegas is well chronicled, from a middle-of-nowhere town to the largest city founded in the 20th century and the fastest-growing in the nation – up until the 2008 housing bust. Somehow, those 8,400 souls turned into a present population of over 2 million that exists all but entirely to service the 40 million tourists who visit annually. And all this is happening in a desert that sees an average of 10 days of measurable rainfall per year, totaling about 4 inches.

In order to run all those lights, fountains, and revolving stages, Las Vegas requires 5,600 MW of electricity on a summer day. Did you notice that that's more than 2.5 times what the giant Hoover Dam can put out? Not to mention that those 42 million people need a lot of water to drink to stay properly hydrated in the 100+ degree heat. And it all comes from Lake Mead.

So what do you think is happening to the lake?

If your guess was, "it's shrinking," you're right. The combination of recent drought years in the West and rapidly escalating demand has been a dire double-whammy, reducing the lake to 40% full. Normally, the elevation of Lake Mead is 1,219 feet. Today, it's at 1,086 feet and dropping by ten feet a year (and accelerating). That's how much more water is being taken out than is being replenished.

This is science at its simplest. If your extraction of a renewable resource exceeds its ability to recharge itself, it will disappear – end of story. In the case of Lake Mead, that means going dry, an eventuality to which hydrologists assign a 50% probability in the next twelve years. That's by 2025.

Nevadans are not unaware of this. There is at the moment a frantic push to get approval for a massive pipeline project designed to bring in water from the more favored northern part of the state. Yet even



if the pipeline were completed in time, and there is stiff opposition to it (and you thought only oil pipelines gave way to politics and protests), that would only resolve one issue. There's another. A big one.

Way before people run out of drinking water, something else happens: When Lake Mead falls below 1,050 feet, the Hoover Dam's turbines shut down – less than four years from now, if the current trend holds – and in Vegas the lights start going out.

Ominously, these water woes are not confined to Las Vegas. Under contracts signed by President Obama in December 2011, Nevada gets only 23.37% of the electricity generated by the Hoover Dam. The other top recipients: Metropolitan Water District of Southern California (28.53%); state of Arizona (18.95%); city of Los Angeles (15.42%); and Southern California Edison (5.54%).

You can always build more power plants, but you can't build more rivers, and the mighty Colorado carries the lifeblood of the Southwest. It services the water needs of an area the size of France, in which live 40 million people. In its natural state, the river poured 15.7 million acre-feet of water into the Gulf of California each year. Today, twelve years of drought have reduced the flow to about 12 million acre-feet, and human demand siphons off every bit of it; at its mouth, the riverbed is nothing but dust.

Nor is the decline in the water supply important only to the citizens of Las Vegas, Phoenix, and Los Angeles. It's critical to the whole country. The Colorado is the sole source of water for southeastern California's Imperial Valley, which has been made into one of the most productive agricultural areas in the US despite receiving an average of three inches of rain per year.

The Valley is fed by an intricate system consisting of 1,400 miles of canals and 1,100 miles of pipeline. They are the only reason a bone-dry desert can look like this:

Intense conflicts over water will probably not be confined to the developing world. So far, Arizona, California, Nevada, New Mexico, and Colorado have been able to make and keep agreements defining who gets how much of the Colorado River's water. But if populations continue to grow while the snowcap recedes, it's likely that the first shots will be fired before long, in US courtrooms.



If legal remedies fail... a war between Phoenix and LA might seem far-fetched, but at the minimum some serious upheaval will eventually ensue unless an alternative is found quickly.

Water scarcity is, of course, not just a domestic issue. It is far more critical in other parts of the world than in the US. It will decide the fate of people and of nations.

Worldwide, we are using potable water way faster than it can be replaced. Just a few examples:

- The Aral Sea was once the fourth-largest freshwater lake in the world; today, it has shrunk to 10% of its former size and is on track to disappear entirely by 2020.<u>Watching what has</u> <u>happened just since the turn of the century is stunning</u>.
- The legendary Jordan River is flowing at only 2% of its historic rate.
- In Africa, desertification is proceeding at an alarming rate. Much of the northern part of the continent is already desert, of course. But beyond that, a US Department of Agriculture study places about 2.5 million km2 of African land at low risk of desertification, 3.6 million km2 at moderate risk, 4.6 million km2 at high risk, and 2.9 million km2 at very high risk. "The region that has the highest propensity," the report says, "is located along the desert margins and occupies about 5% of the land mass. It is estimated that about 22 million people (2.9% of the total population) live in this area."
- A 2009 study published in the American Meteorological Society's Journal of Climateanalyzed 925 major rivers from 1948 to 2004 and found an overall decline in total discharge. The reduction in inflow to the Pacific Ocean alone was about equal to shutting off the Mississippi River. The list of rivers that serve large human populations and experienced a significant decline in flow includes the Amazon, Congo, Chang Jiang (Yangtze), Mekong, Ganges, Irrawaddy, Amur, Mackenzie, Xijiang, Columbia, and Niger.

Supply is not the only issue. There's also potability. Right now, 40% of the global population has little to no access to clean water, and despite somewhat tepid modernization efforts, that figure is actually expected to jump to 50% by 2025. When there's no clean water, people will drink dirty water – water contaminated with human and animal waste. And that breeds illness. It's estimated that fully half of the world's hospital beds today are occupied by people with water-borne diseases.



Food production is also a major contributor to water pollution. To take two examples:

- The "green revolution" has proven to have an almost magical ability to provide food for an ever-increasing global population, but at a cost. Industrial cultivation is extremely water intensive, with 80% of most US states' water usage going to agriculture and in some, it's as high as 90%. In addition, factory farming uses copious amounts of fertilizer, herbicides, and pesticides, creating serious problems for the water supply because of toxic runoff.
- Modern livestock facilities known as concentrated animal feeding operations (CAFOs) create enormous quantities of animal waste that is pumped into holding ponds. From there, some of it inevitably seeps into the groundwater, and the rest eventually has to be dumped somewhere. Safe disposal practices are often not followed, and regulatory oversight is lax. As a result, adjacent communities' drinking water can come to contain dangerously high levels of E. coli bacteria and other harmful organisms.

Not long ago, scientists discovered a whole new category of pollutants that no one had previously thought to test for: drugs. We are a nation of pill poppers and needle freaks, and the drugs we introduce into our bodies are only partially absorbed. The remainder is excreted and finds its way into the water supply. Samples recently taken from Lake Mead revealed detectable levels of birth control medication, steroids, and narcotics... which people and wildlife are drinking.

Most lethal of all are industrial pollutants that continue to find their way into the water supply. The carcinogenic effects of these compounds have been well documented, as the movie-famed Erin Brockovich did with hexavalent chromium.

But the problem didn't go away with Brockovich's court victory. The sad fact is that little has changed for the better. In the US, our feeble attempt to deal with these threats was the passage in 1980 of the so-called Superfund Act. That law gave the federal government – and specifically the Environmental Protection Agency (EPA) – the authority to respond to chemical emergencies and to clean up uncontrolled or abandoned hazardous-waste sites on both private and public lands. And it supposedly provided money to do so.



How's that worked out? According to the Government Accountability Office (GAO), "After decades of spearheading restoration efforts in areas such as the Great Lakes and the Chesapeake Bay, improvements in these water bodies remain elusive ... EPA continues to face the challenges posed by an aging wastewater infrastructure that results in billions of gallons of untreated sewage entering our nation's water bodies ... Lack of rapid water-testing methods and development of current water quality standards continue to be issues that EPA needs to address."

Translation: the EPA hasn't produced. How much of this is due to the typical drag of a government bureaucracy and how much to lack of funding is debatable. Whether there might be a better way to attack the problem is debatable. But what is not debatable is the magnitude of the problem stacking up, mostly unaddressed.

Just consider that the EPA has a backlog of 1,305 highly toxic Superfund cleanup sites on its to-do list, in every state in the union (except apparently North Dakota, in case you want to try to escape – though the proliferation of hydraulic fracking in that area may quickly change the map, according to some of its detractors – it's a hotly debated assertion).

About 11 million people in the US, including 3-4 million children, live within one mile of a federal Superfund site. The health of all of them is at immediate risk, as is that of those living directly downstream.

We could go on about this for page after page. The situation is depressing, no question. And even more so is the fact that there's little we can do about it. There is no technological quick fix.

Peak oil we can handle. We find new sources, we develop alternatives, and/or prices rise. It's all but certain that by the time we actually run out of oil, we'll already have shifted to something else.

But "peak water" is a different story. There are no new sources; what we have is what we have. Absent a profound climate change that turns the evaporation/rainfall hydrologic cycle much more to our advantage, there likely isn't going to be enough to around.

As the biosphere continually adds more billions of humans (the UN projects there will be another 3.5 billion people on the planet, a greater than 50% increase, by 2050 before a natural plateau really



starts to dampen growth), the demand for clean water has the potential to far outstrip dwindling supplies. If that comes to pass, the result will be catastrophic. People around the world are already suffering and dying en masse from lack of access to something drinkable... and the problems look poised to get worse long before they get better.

With a problem of this magnitude, there is no such thing as a comprehensive solution. Instead, it will have to be addressed by chipping away at the problem in a number of ways, which the world is starting to do.

With much water not located near population centers, transportation will have to be a major part of the solution. With oil, a complex system of pipelines, tankers, and trucking fleets has been erected, because it's been profitable to do so. The commodity has a high intrinsic value. Water doesn't – or at least hasn't in most of the modern era's developed economies – and thus delivery has been left almost entirely to gravity. Further, the construction of pipelines for water that doesn't flow naturally means taking a vital resource from someone and giving it to someone else, a highly charged political and social issue that's been known to lead to protest and even violence. But until we've piped all the snow down from Alaska to California, transportation will be high on the list of potential near term solutions, especially to individual supply crunches, just as it has been with energy.

Conservation measures may help too, at least in the developed world, though the typical lawnwatering restrictions will hardly make a dent. Real conservation will have to come from curtailing industrial uses like farming and fracking.

But these bandage solutions can only forestall the inevitable without other advances to address the problems. Thankfully, where there is a challenge, there are always technology innovators to help address it. It was wells and aqueducts that let civilization move from the riverbank inland, irrigation that made communal farming scale, and sewers and pipes that turned villages into cities, after all. And just as with the dawn of industrial water, entrepreneurs are developing some promising tech developments, too.

Given how much water we use today, there's little doubt that conservation's sibling, recycling, is going to be big. Microfiltration systems are very sophisticated and can produce recycled water that is



near-distilled in quality. Large-scale production remains a challenge, as is the reluctance of people to drink something that was reclaimed from human waste or industrial runoff. But that might just require the right spokesperson. California believes so, in any case, as it forges ahead with its Porcelain Springs initiative. A company called APTwater has taken on the important task of purifying contaminated leachate water from landfills that would otherwise pollute the groundwater. This is simply using technology to accelerate the natural process of replenishment by using energy, but if it can be done at scale, we will eventually reach the point where trading oil or coal for clean drinking water makes economic sense. It's already starting to in many places.

Inventor Dean Kamen of Segway fame has created the Slingshot, a water-purification machine that could be a lifesaver for small villages in more remote areas. The size of a dorm-room refrigerator, it can produce 250 gallons of water a day, using the same amount of energy it takes to run a hair dryer, provided by an engine that can burn just about anything (it's been run on cow dung). The Slingshot is designed to be maintenance-free for at least five years.

Kamen says you can "stick the intake hose into anything wet – arsenic-laden water, salt water, the latrine, the holding tanks of a chemical waste treatment plant; really, anything wet – and the outflow is one hundred percent pure pharmaceutical-grade injectable water."

That naturally presupposes there is something wet to tap into. But Coca-Cola, for one, is a believer. This September, Coke entered into a partnership with Kamen's company, Deka Research, to distribute Slingshots in Africa and Latin America.

Ceramic filters are another, low-tech option for rural areas. Though clean water output is very modest, they're better than nothing. The ability to decontaminate stormwater runoff would be a boon for cities, and AbTech Industries is producing a product to do just that.

In really arid areas, the only water present may be what's held in the air. Is it possible to tap that source? "Yes," say a couple of cutting-edge tech startups. Eole Water proposes to extract atmospheric moisture using a wind turbine. Another company, NBD Nano, has come up with aself-filling water bottle that mimics the Namib Desert beetle. Whether the technology is scalable to any significant degree remains to be seen.



And finally, what about seawater? There's an abundance of that. If you ask a random sampling of folks in the street what we're going to do about water shortages on a larger scale, most of them will answer, "desalination." No problem. Well, yes problem.

Desalination (sometimes shortened to "desal") plants are already widespread, and their output is ramping up rapidly. According to the International Desalination Association, in 2009 there were 14,451 desalination plants operating worldwide, producing about 60 million cubic meters of water per day. That figure rose to 68 million m3/day in 2010 and is expected to double to 120 million m3/day by 2020. That sounds impressive, but the stark reality is that it amounts to only around a quarter of one percent of global water consumption.

Boiling seawater and collecting the condensate has been practiced by sailors for nearly two millennia. The same basic principle is employed today, although it has been refined into a procedure called "multistage flash distillation," in which the boiling is done at less than atmospheric pressure, thereby saving energy. This process accounts for 85% of all desalination worldwide. The remainder comes from "reverse osmosis," which uses semipermeable membranes and pressure to separate salts from water.

The primary drawbacks to desal are that a plant obviously has to be located near the sea, and that it is an expensive, highly energy-intensive process. That's why you find so many desal facilities where energy is cheap, in the oil-rich, water-poor nations of the Middle East. Making it work in California will be much more difficult without drastically raising the price of water. And Nevada? Out of luck. Improvements in the technology are bringing costs of production down, but the need for energy, and lots of it, isn't going away. By way of illustration, suppose the US would like to satisfy half of its water needs through desalination. All other factors aside, meeting that goal would require the construction of more than 100 new electric power plants, each dedicated solely to that purpose, and each with a gigawatt of capacity.

Moving desalinated water from the ocean inland adds to the expense. The farther you have to transport it and the greater the elevation change, the less feasible it becomes. That makes desalination impractical for much of the world. Nevertheless, the biggest population centers tend to be clustered along coastlines, and demand is likely to drive water prices higher over time, making desal more



cost-competitive. So it's a cinch that the procedure will play a steadily increasing role in supplying the world's coastal cities with water.

In other related developments, a small tech startup called NanOasis is working on a desalination process that employs carbon nanotubes. An innovative new project in Australia is demonstrating that food can be grown in the most arid of areas, with low energy input, using solar-desalinated seawater. It holds the promise of being very scalable at moderate cost.

This article barely scratches the surface of a very broad topic that has profound implications for the whole of humanity going forward. The World Bank's Ismail Serageldin puts it succinctly: "The wars of the 21st century will be fought over water."

There's no doubt that this is a looming crisis we cannot avoid. Everyone has an interest in water. How quickly we respond to the challenges ahead is going to be a matter, literally, of life and death. Where we have choices at all, we had better make some good ones.

"The Upcoming Water Shortage Crisis", 26/02/2013, online at: <u>http://goldnews.bullionvault.com/water-shortage-crisis-022620133</u>

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* Climate Change, Migration, and Conflict in the Amazon and the Andes

Rising Tensions and Policy Options in South America

The Amazon; the tropical savannahs of Brazil—the Cerrado—and Bolivia; the Andean highlands of Peru and Bolivia; and the arid coastal plain of Peru, represent the major geographic and climatic regions of the continent, encompass the range of socioeconomic trends reshaping the region, and capture the new heartland of the continent's illicit economies, including the global cocaine trade.

This report examines the interactions of climate change, environmental degradation, migration, and conflict in the Amazon; the tropical savannahs of Brazil—the Cerrado—and Bolivia; the Andean highlands of Peru and Bolivia; and the arid coastal plain of Peru. These regions represent the major geographic and climatic regions of the continent, encompass the range of socioeconomic trends reshaping the region, and capture the new heartland of the continent's illicit economies, including the global cocaine trade.

The natural wealth of the Amazon and the Andes is a crucial strategic resource. The Amazon is central to the regional and global climate and contains priceless biodiversity. The mineral wealth and energy resources of the Amazon and the Andes are also important contributors to the global supply chain and the macroeconomic growth of the region. Further, the Amazon and the Cerrado have adopted a crucial role in regional and global food security. Finally, the rivers and glaciers of the region are fundamental to the energy security, water security, and agricultural health of much of South America. For all these reasons, the areas defined in this report demand attention. There are two caveats about this report. First, the study of climate change, migration, and conflict or insecurity in this region is more predictive in nature, compared to the earlier reports in this series. While many people in the region are experiencing profound dislocation or human insecurity because of the trends outlined in this report, the prospects for massive humanitarian disasters or country collapse are remote, unlike in Northwest Africa or the Bay of Bengal—topics of previous reports. Nonetheless, the trends are worrying and deserve the focused attention of policymakers in the Hemisphere.

Second, in line with the Climate, Migration, and Security Project, and driven by the evidence, this report is concerned with the periphery—the geographic and sociopolitical margins of the region. These peripheral regions or hinterlands are immense, far from the political and financial hubs of their countries and overwhelmingly rural with deeply entrenched poverty. Yet the pressures of population and global demand for commodities have driven the rapid growth of towns and cities on this periphery, cities that face the challenge of navigating a path of sustainable, stable development in difficult environments.

This report looks at the most vulnerable residents of this periphery, particularly small-hold farmers and indigenous populations, and on the ungoverned or undergoverned marginal areas of the three countries studied. While the major urban centers and agricultural areas of Brazil's Northeastern, Southeastern, and Southern regions make cameo appearances because of their role in the regional migratory picture and international drug trade, they are not the focus of this report. Instead we examine how, in the peripheral regions of the Amazon and the Andes, an effective government



presence is absent, rural livelihoods have been undermined, illicit economies have flourished, drug trafficking organizations and nonstate actors have put down deep roots, and the unregulated exploitation of natural resources and vulnerable populations continues apace.

New strategies are needed to comprehensively address these sources of instability. We must account for the dislocation caused by climate change and human mobility and facilitate smart and sustainable security strategies. Combating organized crime and the international narcotics trade, providing sustainable development, and preparing for the effects of climate change are the central challenges for the region in the decades to come.

These challenges intersect in the peripheral areas described in this paper, and military or police approaches to combat the presence of transnational criminal networks will not succeed without a more fundamental strategy for porous border regions.

The peripheral populations of the Amazon and the Andes must have their basic livelihoods protected in order to guarantee the future social and political stability of the region. They must be provided with effective governance that is capable of responding to the needs of its residents, regulating development, and protecting basic human security.

Governments must rise to the challenge and play the role of fair arbiter, balancing macroeconomic growth and the interests of extractive industry with equitable, sustainable development. The region's stability can only be protected by fairly resolving fundamental questions related to the division and proper management of natural resources. Government involvement is also needed to adapt to and prepare for climate change, along with providing relief for inevitable sudden-onset disasters linked to climate change.

To the extent possible, regional governments should seek to incentivize sustainable development, for example, by shaping infrastructure planning to encourage development of climate-resilient areas, and provide disincentives for those who seek to exploit particularly vulnerable regions. Finally, effective regional approaches to hydropower and renewable energy sources should be continued and expanded, and a more comprehensive, nonmilitary response to drug trafficking established.

While these efforts are the responsibility of all regional governments and numerous international organizations, it is particularly incumbent upon both Brazil and the United States to lead these processes.

For Brazil, there are fundamental reasons for protecting and sustaining the Amazon, so crucial to the economic health of the country. For both Brazil and the United States, successful action against the international trade in narcotics—and the illicit economies that grow in conjunction with it—will strengthen social stability in both countries, particularly in large urban centers.

By leading such regional efforts, Brazil also has an opportunity to define its 21st century global role in a progressive, peaceful way. And for the United States these efforts provide a chance to revive and sustain its hemispheric standing, have a partner in assuring stability in the region, establish long-term, sustainable economic relationships, and avoid future crises.

Given Latin America's economic rise, the United States and its European partners will have to manage a new modus vivendi to help steer regional transitions. For the United States, the challenge is to adapt defense and development policy to a new environment while coping with imminent budget



WATER RESEARCH PROGRAMME -Weekly Bulletin-

cuts—crucial if the United States is to remain at the center of hemispheric affairs. South America, with Brazil at its heart, should form the centerpiece of a renewed engagement in democratic partnerships for the United States and Europe.

We begin with an overview of the issues covered in this paper, which include:

- The major economic changes taking place in Latin America, particularly Brazil
- The regional geographies and how they affect climate, migration, and conflict
- How climate change is affecting the region
- Increasing social instability due to economic and environmental shifts

We then examine these issues at play in Brazil, Peru, and Bolivia before moving to our recommendations for U.S. and Latin American policies to address them.

"Climate Change, Migration, and Conflict in the Amazon and the Andes", Max Hoffman and Ana I. Grigera, 26/02/2013, online at: <u>http://www.americanprogress.org/issues/security/report/2013/02/26/54570/climate-change-migration-and-conflict-in-the-amazon-and-the-andes/</u>

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* A Report Card for Global Food Giants

The antipoverty group Oxfam has come up with a scorecard that evaluates the impact that the supply chains of behemoth food companies have on water consumption, labor and wages, greenhouse gas emissions and nutrition.

The goal of the scorecard, called <u>"Behind the Brands,"</u> is to motivate consumers to pressure companies like Nestlé, Kellogg and Mars to improve their policies on land and water use and the <u>treatment of small farmers</u>, among other things, and to reduce waste and greenhouse gas emissions.

"Customer choice helps these companies build brand loyalty and value, which helps them build the bottom line," said Raymond C. Offenheiser, president of Oxfam America. "These supply chains are what connects the consumer to the farmer in the field, and there is an increasing interest in that."

Apparel and mining companies have moved to increase the transparency of their supply chains, improving their practices in the process, Mr. Offenheiser said. But food companies are notably opaque when it comes to disclosing how they obtain the ingredients for the food they sell.

In fact, they sometimes openly fight such disclosure, spending tens of millions of dollars recently, for instance, to avoid disclosing the use of genetically engineered ingredients on food packaging. Some have also resisted identifying the countries where their ingredients originate.

But consumers today have more information about the food they eat than ever, and the impact of that knowledge is increasingly clear. The reaction against organic and natural food brands whose corporate parents fought a California ballot initiative requiring the labeling of genetically modified foods persists, even though it was defeated in November. And a 15-year-old recently waged a successful campaign to get brominated vegetable oil, a controversial food additive, removed from Gatorade.

"I think these companies understand that engaging stakeholders, not just shareholders, is a fact of life going forward," Mr. Offenheiser said. "Growing market share and customer loyalty as a result of that engagement has a direct impact on the bottom line."



He emphasized that Oxfam did not wish to dredge up old scandals – although<u>the</u> <u>report</u> accompanying the new scorecard mentions several – but rather to create what he called "a race to the top."

Two giant European food companies, <u>Nestlé</u> and <u>Unilever</u>, scored highest on the initial scorecard, followed by <u>Coca-Cola</u> and <u>PepsiCo</u>. But no companies received Oxfam's highest ratings across the board. Nestlé, which has worked to reduce the use of water in its processes, was awarded a 7 out of 10 in the water and transparency categories of the scorecard. Unilever received the same score for its treatment of small farmers.

Conversely, 7 of the 10 companies received the lowest score possible for their use of land. Scores for the treatment of women working in agriculture were generally low as well. Seven of the companies received a grade of "extremely poor" or "failing" for the impact of their businesses on climate change.

"A Report Card for Global Food Giants", 26/02/2013, online at: <u>http://green.blogs.nytimes.com/2013/02/26/a-report-card-for-global-food-giants/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=1ece9e6e5d-RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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The Mathematics of Climate Change

Climate change is arguably the most important issue humanity has ever faced. The Earth's average surface temperature continues to climb and weather is increasingly volatile. Our current trajectory looks perilous.

Is the situation really that critical? I asked atmospheric chemist Dr. Laura Foster.

The future world will be a warmer place with different weather patterns and disease patterns and coastlines. We will have to adapt to these changes.

The pessimist in me thinks of human beings on Earth like bacteria in a petri dish: we're going to pollute our petri dish to the point that we can no longer survive in it.

The situation is that critical. Climate change is real. Responding to it will be full of challenges. But there will also be opportunities — an aspect of climate change emphasized by **Dr. Emily Shuckburgh**, a climate scientist based at the <u>British Antarctic Survey</u>.

Dr. Shuckburgh speaks widely about climate change, and if you happen to be in San Francisco next week, you'll have the opportunity to attend one of her talks. Dr. Shuckburgh will be giving a public lecture titled "Climate Disruption: What Math and Science Have to Say" as part of a <u>Mathematics of Planet Earth</u> series being sponsored by the <u>Simons Foundation</u>.

"I think this talk will be of interest to everyone — and of particular interest to those who like math and science," says Brian Conrey, executive director of the <u>American Institute of Mathematics</u>. "Also, Emily is a fantastic role model — she is *so* accomplished — and is an inspiring speaker."

Our puzzle this week touches on the mathematics of climate change by considering one rather absurd response — using a giant mirror to partially block sunlight from reaching the Earth.

Imagine scientists manage to position a giant mirror between the Earth and the Sun. The mirror is placed a hundred kilometers above the Earth's surface. The mirror is large enough to reduce the Earth's average surface temperature by one degree.

How big is the mirror?



That's it for the puzzle. Following is a basic overview of how the Earth's current average surface temperature arises.

It all starts, of course, with the Sun, which blazes away 93 million miles from the Earth. The Sun radiates energy that ultimately reaches the Earth.

This radiant energy from the Sun is absorbed by the Earth, which then radiates energy back out again, enabling the planet to maintain a constant average surface temperature.

If that were the end of the story, the Earth's average surface temperature would be about -18°C. Much too cold to support life as we know it. But there's something else going on. Not all of the energy radiated from the Earth makes it out into space. Some is captured and returned to Earth, resulting in an actual average surface temperature of 15°C.

The capture-and-return process is remarkable. Encasing the Earth are a variety of molecules that make up what we call our atmosphere. These molecules can be classified by the symmetry of their molecular bonds: some molecules — over 99% — have symmetric bonds, while the remaining molecules have asymmetric bonds. Symmetric-bond molecules are invisible to the Earth's radiant energy. They have no impact on the Earth's temperature. But with asymmetric-bond molecules we have a different story.

The asymmetric-bond molecules just happen to have a vibrational frequency that matches the frequency of the energy radiating from the Earth. When this radiating energy strikes an asymmetric-bond molecule, the energy is absorbed, increasing the energy of this bond. When this molecule ultimately strikes the Earth, the stored energy is returned. The Earth is warmed by energy it originally radiated.

These molecules with asymmetric bonds? Water. Carbon dioxide. Carbon monoxide. Methane. And there are others. Another name for these molecules: greenhouse gases. (The primary symmetric-bond molecules are nitrogen and oxygen.)

These asymmetric-bond molecules constitute a tiny fraction of the atmosphere — measured in parts per million — but their ability to capture a portion of the Earth's radiant energy and ultimately



deliver it back to Earth enables the molecules to have an oversized impact on the planet's average temperature.

And it's this oversized impact of these asymmetric-bond molecules that makes their reduction — as opposed to methods for reducing incoming solar radiation — the focus of the work being done to address climate change. (Reducing these carbon-based molecules has other benefits as well, including reducing ocean acidification.) Learn more about the fascinating chemistry of climate change by clicking <u>here</u> to download a terrific introduction by Dr. Laura Foster.

Following is an overview of the basic mathematics behind the Earth's surface temperature before the warming effect of the atmosphere. (Additional details can be found in <u>this presentation</u> by Dr. Mary Lou Zeeman.)

Without deriving the formulas — the basic idea is that the Earth's surface must attain a temperature high enough to enable it to radiate the same energy it receives from the Sun. Incoming and outgoing energy must balance.

Incoming solar energy is found by taking average incoming solar radiation (1367 Watts/square meter) and multiplying by the cross section of the Earth (1.275 x 10^{14} square meters):

1367 x $(1.275 \times 10^{14}) = 1.743 \times 10^{17}$ Watts

This must match outgoing energy: energy reflected off clouds, sand, and other reflective surfaces, and energy being radiated from the Earth. About 30% of energy is reflected, creating a net incoming energy of 70% of 1.743×10^{17} Watts, or 1.22×10^{17} Watts.

This net incoming energy must then be balanced by an equal amount of energy radiating from the Earth. This radiating energy equals the temperature of the Earth T raised to the fourth power, multiplied by the surface area of the Earth (5.10×10^{14} square meters), and then multiplied by something called the <u>Stefan-Boltzmann constant</u> (5.67×10^{-8}), enabling us to find T:

$$T^4 x (5.10 x 10^{14}) x (5.67 x 10^{-8}) = 1.22 x 10^{17}$$

 $T^4 = 4.22 \ x \ 10^9$



T = 255

So an Earth with an average surface temperature of 255 Kelvin, or -18°C, will radiate exactly enough energy to balance incoming energy from the Sun.

A final note to Numberplay regulars: this week's puzzle is actually quite straightforward, but there are some fascinating bits to explore. Why, for example, in Stefan-Boltzmann's Law, is the energy radiated by a blackbody radiator per second per unit area proportional to the *fourth* power of the absolute temperature? And — even more basic — why is the surface area of a sphere exactly four times the area of its cross section? Finally, and perhaps most important, what do you believe to be the best way to reduce climate change?

Solution

Check back on March 4 for the solution to this week's puzzle.

- Dr. Emily Shuckburgh's "Climate Disruption: What Math and Science Have to Say" talk will be held at San Francisco's <u>Palace of Fine Arts</u> on March 4 at 7:30. The talk is sponsored by the <u>Simons Foundation</u> and will be hosted by the <u>American Institute of Mathematics</u> and the<u>Mathematical Sciences Research Institute</u>. Tickets are \$8.50; complimentary tickets are available <u>here</u> — just enter the discount code*earth*.
- 2. The **Mathematics of Planet Earth** initiative is being launched to help integrate and promote the use of mathematics to understand and explain the world's most critical issues, including climate change and sustainability, geophysics, ecology and epidemiology, biodiversity, as well as the global organization of the planet by humans. How does GPS work? Exactly how old is the Earth? Check it all out at the <u>Mathematics of Planet Earth</u>.
- 3. Thank you to **Mary Lou Zeeman** for sharing the Math and Global Temperature presentation, and for offering valuable suggestions for this post. Dr. Zeeman is the R. Wells Johnson



Professor of Mathematics at Bowdoin College, where she teaches modeling for climate and sustainability.

- 4. Thank you as well to **Laura Foster** for sharing the Chemistry of Climate Change presentation, and for providing additional feedback on the content of this post. Dr. Foster is an atmospheric chemist currently at Johns Hopkins University.
- 5. Perhaps the real climate change puzzle is our own inactivity. The science is clear, and the need to reduce planet-warming emissions has grown urgent. So why, collectively, are we doing so little about it? In case you missed it: <u>We're All Climate-Change Idiots</u>.
- 6. Check out Princeton's <u>Carbon Mitigation Initiative</u> for an overview of solutions to climate change using resources available today.
- To number comments, render TeX and display comment images, tryGary Hewitt's <u>Numberplay Comment Enhancer</u>. You may also use the Enhancer to test your TeX before posting.
- 8. Do you have a favorite puzzle? Send it to Numberplay@NYTimes.com. You can also reach me directly at gary.antonick@NYTimes.com.

"The Mathematics of Climate Change", 25/03/2013, online at: http://wordplay.blogs.nytimes.com/2013/02/25/climate/?smid=fb-share

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***** Water Wars? Here in the US?

OK, put away your guns. We're not talking shooting wars, at least not yet, at least not in the U.S. We're talking politicians shooting off their mouths, political wars, and court battles. But water is serious business.

But it is a different story around the world, where there is a long and sad history of violent conflict over water. At the Pacific Institute we maintain the <u>Water Conflict Chronology</u>, documenting examples going back literally 5,000 years.

As others have pointed out, water can be – and often is – a source of cooperation rather than conflict. But conflicts over water are real. And as populations and economies grow, and as we increasingly reach "<u>peak water</u>" limits to local water resources, I believe that the risks of conflicts will increase, even here in the United States, and not just in the water-scarce arid west.

Recently, tensions over water bubbled up in an unlikely spot: the Georgia-Tennessee border. There has been a bit of a border dispute in this region for a long time. Nearly two hundred years actually. Until recently, no one paid much attention to it, and it hasn't been an issue with any particular salience or urgency. There was a <u>flurry of attention</u> around the issue during a severe drought in 2008, and then it died down again. Until now.

What is the issue? If the border can be redrawn (or "corrected" as Georgia puts it), it would give them access to the northernmost bank of the Tennessee River, and a new right to water resources that Georgia would now, desperately, like to tap to satisfy growing demands in the Atlanta region.

In mid-February, the Georgia House of Representatives voted 171-2 to adopt a resolution seeking to reopen the controversy and regain access to the Tennessee River. At the moment, Tennessee lawmakers are more amused than alarmed, but <u>they also say they will act</u> to protect their water from "Peach State poachers." <u>An editorial</u> in the Chattanooga (Tennessee) times Free-Press said: *"We hope Atlanta can find an appropriate solution. But the river in our backyard is not it."*

And recently elected Tennessee Gov. Bill Haslam <u>pledged in his campaign</u> that he would: *"protect our precious resources and will fight any attempt to ... siphon off our water."*



This isn't the only water dispute involving Georgia. For decades, the state has been in a legal battle with Alabama and Florida over the shared Apalachicola-Chattahoochee-Flint river system (I can say that fast, out loud, but it took practice). That dispute has been before the U.S. Supreme Court for years.

And this isn't the only state-to-state water dispute in the U.S. to flare up in recent months. [For a hint of where to look for water tensions, take a look at Figure 1: the U.S. Drought Monitor.] The Republican River flows through the states of Colorado, Nebraska, and Kansas, but sharing the river has been a recurring political dispute for decades. In the latest chapter, the Special Master overseeing an agreement forged in 1943 recently rejected a request by Kansas to punish Nebraska for using too much water. Kansas asked for \$80 million from Nebraska for violations of the Republican River Compact of 1943. The Special Master agreed that Nebraska farmers violated the compact in 2005 and 2006 and took 71,000 acre-feet of water too much, but only proposed awarding a payment of only \$5 million. He also <u>denied a Kansas request</u> to shut off water for some Nebraska farmers along the river.

And don't get me started on the Colorado River, shared by seven U.S. states and Mexico, or the Great Lakes, shared by eight states and Canada.

The fact that these disputes in the U.S. head to court rather than the gun rack is good news. Similar disputes in India, China, and parts of Africa over access and allocation of water too often end in violence, injuries, and deaths.

Water wars don't have to be inevitable, but we're going to have to work harder at defusing tensions around the fair and equitable allocation of our limited water.

"Water Wars? Here in the US?", Peter Geleick, 28/02/2013, online at: http://scienceblogs.com/significantfigures/index.php/2013/02/28/water-wars-here-in-the-us/

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***** German States Oppose Privatization of Municipal Water Supplies

<u>Germany</u>'s upper house of parliament, where the 16 states are represented, today opposed a European Commission proposal to allow the privatization of communal water supplies, saying it's not a good like any other.

The upper house was "critical" of a European Union draft directive on the awarding of certain government contracts, published in December 2011, that would establish standards for awarding concession contracts for services including utilities, the chamber said on its Internet site.

"The Bundesrat attaches great importance to the preservation of the existing structures of municipal responsibility for the drinking water supply," the chamber said in a statement adopted today. "The need to ensure a safe, high- quality and health-safe water supply precludes making water a free merchandise."

The Bundesrat's view that the commission's proposal will lead to a "stealthy opening of the water supply for a purely competitive market" contrasts with the commission's stance that it has a "neutral position on the public or private ownership of water resources."

A citizens' initiative that wants to <u>prevent</u> the privatization of water in the EU and keep water services in the public sector has collected more than 1.2 million signatures.

Petitioners must collect at least 1 million signatures from seven of the EU's 27 member states in order to oblige the commission to propose relevant legislation. Most of the signatures in January came from Germany and <u>Austria</u>, the group said.

The commission's draft directive is under discussion at the European Parliament and the EU Council, which represents the governments of EU member states. The European Parliament is scheduled to finalize its position on the directive in a vote in September and legislation may be finalized by the end of the year.

"German States Oppose Privatization of Municipal Water Supplies", 01/03/2013, online at: <u>http://www.bloomberg.com/news/2013-03-01/german-states-oppose-privatization-of-municipal-water-</u> <u>supplies.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=9b20c02ce6-</u> <u>RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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