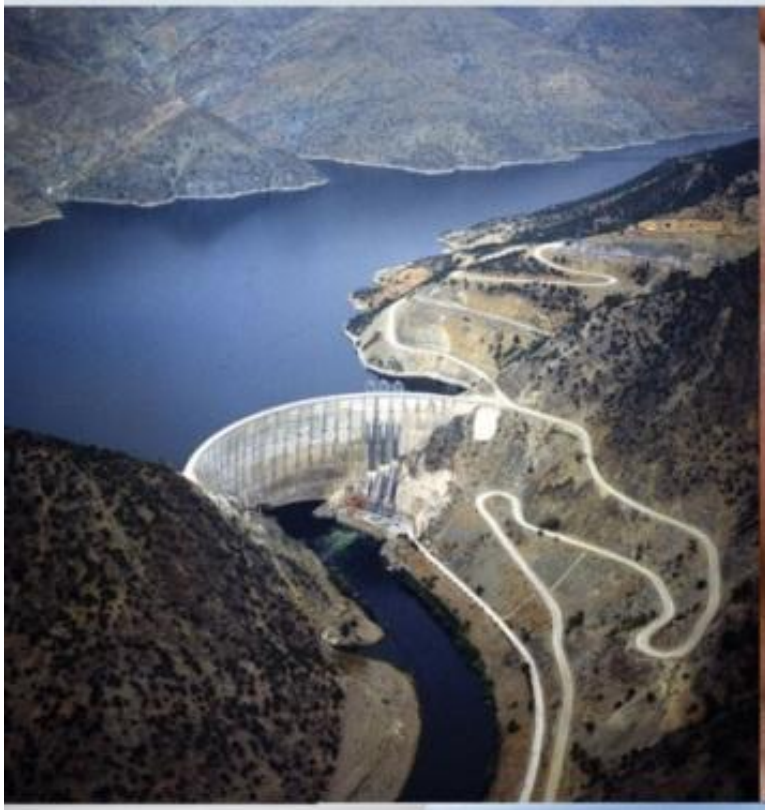


ORSAM WATER BULLETIN

Weekly Bulletin by ORSAM Water Research Programme

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





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Mithat Paşa Caddesi 46/4 Kızılay-Ankara TURKEY
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- **Laos may need incentive to stop building Mekong dam**
- **Dialogue Needed On Mekong Dam Project**
- **Failed Afghan dam project 'offered British military redemption' after Iraq debacle'**
- **'Energy for water' may have greater impact on the nexus**
- **Indonesian gov't outlines ways to improve water supply infrastructure, irrigation**
- **Why Dismissing Water Supply through Water Vendors Is a Bad Idea**
- **Could Water Be the Next Big Asset Class?**
- **Water Demand for Energy to Double by 2035**
- **A One-Stop Shop for Water Worries**
- **Seeing the Sudd from Space**
- **New water retention technology quenches crop thirst in drought conditions**
- **Colorado digs to find water as aquifer-dependent residents fret**
- **In Mexico City, Harvesting Water from the Sky**
- **Editorial, 1/29: New era on water policy**

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❖ Experts discuss wetlands and climate change in Ankara

The "Adaptation to Climate Change and Protection of Biodiversity through Conserving and Sustainably Using Wetlands in Turkey" project was carried out by the GIZ (German Academy for International Cooperation) branch in Turkey, in cooperation with the General Directorate for Nature Conservation and National Parks (DKMP) of the Ministry of Forestry and Water Affairs, and the State Waterworks Authority (DSİ).

A closing meeting was held in Ankara on Jan. 17, 2013 to discuss the final results.

The project was financed by the International Climate Initiative (ICI) of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) of Germany. This wetlands and climate change project, the biggest that the ministry has ever financed, was launched in 2009 and hopes to protect wetlands and promote awareness of their ecological and socio-economic functions and their different uses in order to preserve them for future generations while taking into the account the effects of climate change.

According to the Convention on Wetlands of International Importance, known as the Ramsar Convention, "Wetlands are areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters." Wetlands are considered to be the most important genetic reservoir in the world, and they are also the ecosystem with highest biodiversity after rainforests. Wetlands also balance groundwater by supplying groundwater recharge and discharge, and they positively affect the microclimate by raising the level of humidity in the region. In addition, wetlands clean the water by filtering sedimentation and using nutrients from the sediment. Wetlands with a considerable amount of water play a particularly important role in the treatment of organic and inorganic materials in wastewater. Wetlands are important in economic terms also, having a great value in terms of fishing, agriculture, stockbreeding, sedge cutting, peat and recreation activities.

According to current evaluations, Turkey has 135 areas that qualify as internationally significant wetlands, and they cover an area of just over 2 million hectares. Turkey became a party to the

Ramsar Convention in 1993, and it came into effect in Turkey in 1994. There are 13 wetland areas in Turkey included on the Ramsar list.

The GIZ project included restoration work at Lake Yeniçağa in Bolu and Lake Akgöl, which is located in the Konya, Yunak and Çeltik districts of Konya province. The local residents and administration were also included in the project, including contests to raise environmental awareness among children in the region.

Lake Yenicağa with an area of 122 of square kilometers is one of Turkey's 122 Important Plant Areas, and it is also one of the most important peat lands (40 hectares) of Turkey. The project included an analysis of the biodiversity, habitat mapping, and peat land in the lake, which is approximately four to five meters deep. This was the first peat land analysis carried out in Turkey and included the collection of samples. The canal system, which is used as a sewage system, was also renovated and separated from the wetland area, and lake monitoring stations were also established to protect and preserve the area.

Lake Akgöl in Konya province has now been restored thanks to this project. An area of 2,300 hectares of the lake dried out between 1977 and 1983. The project entailed developing a management model to adapt the wetlands to climate change, including the protection, rehabilitation and maintenance of the ecological functions of wetlands. A general and hydrological analysis, an assessment of its peat land and soil structure, rehabilitation measures, and bird and plant analyses were conducted. As a result, it was discovered that dried peat land in the area emitted a considerable amount of carbon. DSİ built a water gate to recapture water, and though the rehabilitation was completed in 2011, the project was extended for another year to monitor the next stage of project. The water collected reached its maximum level during spring months of 2012, and covered an area of 500 hectares.

Two vital wetlands have been restored and recovered in economic, environmental and sustainable terms through the project, carried out in cooperation with the DKMP and DSİ, and led by GIZ. Wetlands are an important element of the hydrological cycle, and they are rapidly drying up when the necessary precautions are not taken. This causes problems for the surrounding area in both

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environmental and economic terms. GIZ has set an important example for future projects. Local and central institutions need to create the appropriate mechanisms to sustain the work.

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"Experts discuss wetlands and climate change in Ankara", 03/02/2013, online at: http://www.todayszaman.com/news-305903-experts-discuss-wetlands-and-climate-change-in-ankara.html

BACK TO TOP

❖ Grontmij Wins Turkey Water Project to Help Comply With EU

Grontmij NV, Europe's third-largest engineering consultant, won a contract for water and wastewater works in Turkey to help the nation comply with European Union rules.

The work started this month and will take about 30 months to complete, the De Bilt, Netherlands-based company said today in a statement. The contract is valued at 5.5 million euros ($7.5 million).

The project is part of a European Union program to meet water management needs of about 3.5 million people, Grontmij said in the statement.

"Grontmij Wins Turkey Water Project to Help Comply With EU", 31/01/2013, online at: http://www.bloomberg.com/news/2013-01-31/grontmij-wins-turkey-water-project-to-help-comply-with-eu.html

BACK TO TOP

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❖ Turkish Cypriot Republic to Open Tender for Water Works

The breakaway Turkish Cypriot state in northern Cyprus will soon open bids for the distribution of water through a 480-kilometer (300-mile) network, Turkey's state-run Anatolia news agency said today, citing officials.

Turkey started construction three months ago on a pipeline under the Mediterranean Sea to supply fresh water to northern Cyprus. The 107-kilometer (67-mile) pipeline will run from Alakopru dam near Anamur on the Mediterranean coast of Turkey to a dam that will be built in Gecitkoy in northern Cyprus.

"God willing, we will be able to provide fresh drinking water to our people with the help of Turkey in 2014," Anatolia quoted Ali Cetin Amcaoglu, agriculture and natural resources minister of the self-declared Turkish Cypriot state, as saying.

When done, the Turkish pipeline could also supply water to the southern Greek Cypriot side should the island be unified, the Turkish government has said. The line is designed to carry 75 million cubic meters (19.8 billion gallons) of water a year.

The construction of part of the pipeline in Cyprus between Guzelyurt and Gecitkoy has begun and authorities plan to open a tender soon to upgrade the water distribution network in 2013 to prevent piracy and losses, he said.

Amcaoglu said the laying of underwater pipelines will take about three months, with the work starting when weather is suitable, according to Anatolia. Cyprus has been divided between the Republic of Cyprus and Turkish-held north since 1974.

"Turkish Cypriot Republic to Open Tender for Water Works", 29/01/2013, online at:
http://www.businessweek.com/news/2013-01-29/turkish-cypriot-republic-to-open-tender-for-water-works

BACK TO TOP

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❖ Caspian Sea water transfer project gets go-ahead in Iran

It is full steam ahead for a water transport project that will see water transferred from the Caspian Sea to central Iran according to news reports published this week.

On April 16, 2012, Iran launched the Caspian Sea Water Transfer Project to examine the possibility of desalinating water from the Caspian Sea, an idea criticized by riparian countries and environmentalists, and moving it via a pipeline into Iran. Feasibility studies have been completed and the project was approved last week. The deputy minister for water and wastewater management of the Iranian Ministry of Energy was designated as the project manager.

The project, which will cost $1.5 billion, involves desalinating Caspian Sea water in order for it to be used as drinking water and for irrigation purposes. The first stage of the project envisages having 200 million cubic meters of water drawn from the Caspian Sea on average per year. Ultimately the projects aim to transfer 500 million cubic meters of water annually to the Iranian central plateau and Kavir Desert via a 500-kilometer-long pipeline. It is stated that within the scope of the project, Simman, and then Yazd and Kerman, will have the water irrigated through their territories on to Sari County in Mazandaran province.

Similar to this plan, Iran has also started to work on another project which would transfer water from the Persian Gulf to southern Iran. Water resources in Iran remain insufficient both in current and in future projections due to the low precipitation rate as well as the increasing population and urbanization. Iran, whose precipitation rate is below the world average, has chosen to overcome inter-basin water imbalance and water need by providing inter-basin water transfer. During the National Comprehensive Water Study, which was carried out in Iran in 2005, the renewable annual water resource per capita was set as 2,000 cubic meters, while it was estimated to be 1,000 cubic meters for the year 2025.

As a result of the five-year development plans that were executed between 1989-2003, particularly in the Caspian Basin and Persian Gulf -- Oman Sea Basin waters were transferred to the central basin through water lines in order to meet water needs. The Karun and Dez rivers play an important role in inter-basin water transfer. Assessments carried out by Iran indicated that these projects do not disturb the water balance of the donor basin, and the amount of water transferred was measured to be at a

very low level, as well as that it would not affect any of the projects to be carried out in donor basins in the future. Furthermore, the projects did not harm the environment, nor affect the socioeconomic structure of the area. Iran has been carrying 2,110 million cubic meters of water in its inter-basin water transfer projects in operation.

Environmentalists, on the other hand, considered this project as far from being applicable and practicable; they also stated that the cost of the water transfer is quite high.

Transferring water among the basins within its own borders for many years, Iran has not held any consultation with riparian countries on this project. The Caspian Sea, with a surface area of 371,000 square kilometers and a water volume of 78,200 cubic kilometers, is a closed basin with no flow to the outside. It is bounded to the north by Russia, to the south by Iran, to the west by Azerbaijan, and to the east by Kazakhstan and Turkmenistan. Obtaining water through desalination of the Caspian Sea has taken place before, but the projects have not been as large as Iran's new project.

While other countries surrounding the Caspian border such as Russia, Turkmenistan, Kazakhstan and Azerbaijan draw attention to the unclear legal status of the Caspian Sea, ecologists have expressed their worries about the effect of the project on the ecological structure of the Caspian Sea in an area with an example such as the Aral Sea, which is largely dried up due to inappropriate irrigation policies since the 1950s.

While some environmental experts argue that drawing 500 million cubic meters of water per year would negatively affect the Caspian Sea, especially in terms of shoaling -- others state that this figure will not negatively affect the Caspian Sea and that it would not affect the depth of the Caspian Sea either. With the inter-basin water transfer, Iran envisages to overcome the inter-basin water imbalance and to meet water needs by transferring water first from the Caspian Sea and then from the Persian Gulf. While Iran states that it will move forward with the project within two months, the approaches of riparian countries towards Iran will be affected and shaped by political balances in the region.

The Caspian Sea Water Transfer Project is expected to be completed within 24 months and will contribute to the development of the country.

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"Caspian Sea water transfer project gets go-ahead in Iran", 03/02/2013, online at: http://www.todayszaman.com/news-305904-caspian-sea-water-transfer-project-gets-go-ahead-in-iran.html

BACK TO TOP

❖ Western sanctions exacerbate Iran's water problem

Water shortage has always been a pressing problem in Iran due to its arid and semi-arid climate. Today, as sanctions clamp down on the country, this issue has gained increased importance.

In the past, Iran has maintained its water levels through control of natural resources and extensive programs for subsidizing its population. At the expense of revenue from the oil exports that shaped the country's budget in its entirety, Iran imported all necessary foodstuffs, especially wheat and rice, production of which requires lots of water. Now, Iran cannot afford to continue on like this.

In addition, Iran is seeking to establish local production of industrial products that were previously imported. According to official in country data, the industrial and agricultural sectors are actively increasing production volumes to replace imports. However, the development of heavy industry (metallurgy, mining, large energy facilities) requires a significant increase in the consumption of fresh water. Agriculture also requires vast amounts of water, 41% of which is grown with risky bets placed on the weather.

Iran is actively seeking ways to ensure its increasing demand for water. According to Iranian media, Iran is currently in talks with other countries on the import of water to its provinces facing water shortages. However, the only country to offer its assistance to Iran is Tajikistan, which has a surplus of water, but is deficient in energy. Earlier, Tajikistan offered its water resources to neighboring countries free of charge; in turn, they were only to build a water pipeline and pumps at their own expense. Today, given Iran's thirst and the fact that it is willing to pay for water with its energy resources, Tajikistan will not give up its benefits for free. The water supply project is directly related to the construction of the pipeline to transfer Iranian oil to Tajikistan. Moreover, it is expected to not only deal with water, but also water and energy, which will result in the connection of national power grids.

In exchange for Iranian oil, Tajikistan is ready to provide clean drinking water from mountainous Lake Sarez in the Pamirs, and bring it to the Iranian province of Khorasan through the conduit. In turn, Iran is ready to begin the laying of the pipe to import one billion cubic meters of water.

Although experts acquainted with the Sarez Lake region and technical features of the project believe that implementation of such a large-scale project may carry on for decades.

Iran has many more ideas concerning water provision described in its National Water Plan, but many of them are limited by international conventions. Thus, Iran's desire to use water from the Araz River to fill drying Lake Urmia may cause problems with Azerbaijan, with which Iran signed an agreement on the joint use of the Araz River. The construction of the Caspian - Persian Gulf shipping canal, which also provides for the transfer of 500 million cubic meters of water from the Caspian Sea to the central regions of Iran affected by drought, and its use in agriculture and industry, is contrary to international conventions and international agreements, coupled with the unresolved status of the Caspian Sea. Unresolved issues of division of border rivers (mainly the Hariruda and Helmand) can also lead to serious political conflicts with the neighbors.

Thus, lack of water has turned into another aggravating factor for Iran which is already experiencing social and economic difficulties due to international sanctions.

"Western sanctions exacerbate Iran's water problem",30/01/2013, online at: http://en.trend.az/capital/analytical/2113717.html

BACK TO TOP

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❖ Iran boosts electricity export in western Afghanistan

According to officials in ministry of water and energy of Afghanistan, Islamic Republic of Iran is due to boost electricity export to western provinces of Afghanistan based on a new agreement signed between the two nations.

The agreement was signed between Afghan water and energy minister Mohammad Ismail and his Iranian counterpart Majid Namjo in capital Kabul.

The Afghan government signed a contract with the neighboring Iran back in 2002 to provide electricity for western provinces of Afghanistan.

Mohammad Ismail Afghan water and energy minister the new agreement will resolve issues of electricity shortage in Nimroz and Herat provinces of Afghanistan.

Mohammad Humayoun Kohistani head of the energy department in Afghan electricity department said the government of Afghanistan is keen on extending the agreement as western provinces of Afghanistan is need of electricity.

Iran was providing 90 mega watt of electricity per hour based on the old agreement however Iran will now export 164 mega watt of electricity per hour according to the new agreement signed between the two nations.

Mr. Kohistani said the government of Afghanistan will purchase $26 million worth of electricity annually from Iran and the agreement will be valid until 2015.

In the meantime Iranian energy and electricity minister Mr. Namjo expressed concerns regarding growing instability in Afghanistan which prevents long term projects implementation in the country.

Afghanistn water and energy minister also inked a number of other agreements including economic cooperation and technical assistance in water and energy section with Iran.

According to the agreements Iran will assist and train Afghan water and energy minister officials.

This comes as the Afghan government in cooperation with Iran activated two generator sets which can produce 50 mega watt of electricity in capital Kabul.

Officials said the two generator sets will consume 18,000 litre of oil per hour and will be used during emergy period only.

The electricity of Afghanistan is currently provided by neighboring coutries including Tajikistan, Turkmenistan, Uzbekistan and Iran.

"Iran boosts electricity export in western Afghanistan", 28/01/2013, online at: http://www.khaama.com/iran-boosts-electricity-export-in-western-afghanistan-2154

BACK TO TOP

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❖ Iran Wants More Water, Power Ties With Afghanistan, Fars Reports

Iran President Mahmoud Ahmadinejad is seeking to strengthen links with neighboring Afghanistan, saying Iranian electricity and water companies have opportunities there, the state-run Fars news agency said.

Iranian Energy Minister Majid Namjou visited the Afghan capital Kabul and discussed boosting such ties with President Hamid Karzai and Energy and Water Minister Muhammad Ismail Khan, Fars said. While there, Namjou inaugurated two Iranian-made electricity turbines, the news agency said.

"Iran Wants More Water, Power Ties With Afghanistan, Fars Reports", 28/01/2013, online at: http://www.bloomberg.com/news/2013-01-28/iran-wants-more-water-power-ties-with-afghanistan-fars-reports.html

BACK TO TOP

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❖ Iraqi Agriculture in Crisis

Beset by a lack of expertise, capability and workforce, agriculture in Iraq — and other sectors of the economy — is dysfunctional.

In the mid-1990s, following the invasion of Kuwait, an economic blockade was imposed on Iraq, preventing the import of vital goods. Vast tracts of Iraqi land were used at the time to meet 50% of the domestic wheat demands.

According to experts, agriculture represented 7% of Gross National Product (GNP) in the 1990s.

In the aftermath of the 2003 Iraq war, agricultural productivity decreased by 90%. The workforce shifting toward state employment, a lack of government subsidization and the lingering effects of long years of severe drought all took their toll on agriculture. From 2004 until 2010, Iraq witnessed its driest winters on record.

Across large swaths of Iraq, wheat crops rely heavily on rain. This agriculture is widely spread in Kurdistan, the provinces of Anbar and Saladin, the city of Mosul and some southern regions, all of which typically experience high amounts of rainfall.

Saddam Hussein's regime succeeded in persuading the owners of large agricultural holdings to invest in wheat through tripling the prices paid for the crops. When the government of Nouri al-Maliki, on the other hand, followed Saddam's steps in 2008 by doubling the prices, they aroused little interest on the part of farmers.

For years now, the amount of wheat bought by the Ministry of Trade from local farmers has been steady and not seen any sort of rise, even when prices doubled. As this quantity has increased by 10% since the year 2009, the absence of local contribution has become even more apparent.

Raad Khalil, an Iraqi in his thirties, says that he "temporarily" works in agriculture. "I am looking for a government job, and there are a few officials who have promised to hire me," he adds. Khalil owns 7,000 square metres of land along the Euphrates River near al-Ramadi, one of Iraq's biggest towns. "Agriculture is a hard task to perform and does not provide a steady livelihood; I have a family whose needs I must meet. At times, I make $500 per month, other times only $100 and on occasion I don't earn anything at all. The Iraqi soldier receives a salary of $1,000 monthly. Why not ensure a fixed and stable income for my family?"

Khalil holds a diploma in Islamic studies. He explained that the majority of young farmers in his region have enlisted in the army or police force, while the rest are waiting in line. "The area of plowed lands is dwindling day after day; the workforce is becoming scarce," he declares.

Khalil must constantly deal with his father's vehement reluctance. "My father belongs to this land; he urges me to pursue agriculture work. We have been a family of farmers for centuries," he says.

Despite the government's support, the number of farmers has fallen.

The figures of the Ministry of Agriculture indicate a significant decrease in the number of farmers and the area of plowed land, a high-ranking official in the ministry confirmed. Speaking on condition of anonymity, he reiterated that "this work is no longer tempting. Farmers enviously watch government employees buying brand-new vehicles and replacing their furniture. They want the same for themselves."

When asked if the state were capable of restoring the legacy of agriculture through subsidizes, he replied, "If people do not believe it can be restored, the state cannot do anything to change their views."

The government provides farmers with fertilizer, agricultural equipment, different types of seeds and pesticides at subsidized prices. Additionally, it offers installment plans if farmers wish to buy tractors or other necessary vehicles.

The agricultural slump did not only impact wheat. Post-2003, the repercussions have been felt by other crops such as potatoes and tomatoes. Iraq, once a major exporter, has become dependent on imports all year round.

Crops imported from Iran, Jordan, Kuwait and Turkey are highly competitive in terms of quality and price.

"Jordan uses techniques that Iraq lacks such as drip irrigation and sprinklers while we opt for surface irrigation. Thus, Jordanian farmers need one quarter of the water that we do," Khalil says.

In 2011, the government tried to limit the import of crops. As a result, prices skyrocketed and what was thought to be a way to boost local agriculture failed miserably.

"Iraqi Agriculture in Crisis", 29/01/2013, online at: http://www.al-monitor.com/pulse/originals/2013/01/iraq-farmers-abandon.html

BACK TO TOP

❖ Water sharing across MENA raised at Arab Water Week 2013

The Arab Water Week 2013 has officially commenced with the issues of cross-border water sharing, wastewater reuse and renewable powered desalination all put at the top of the agenda for discussion.

Under the Royal Patronage of H.R.H Prince El Hassan Bin Tala, the event is the second week to be organised by the Arab Countries Water Utility Association (ACWUA) and is in partnership with the Jordanian Ministry of Water and Irrigation, under the umbrella of the Arab Ministerial Council/League of Arab States.

H.E. Eng. Khaldon Khashman, secretary general of ACWUA, opened the event by saying that mechanisms are being put firmly in place so that there can be a better understanding of the water sector in the region.

He said that there are now 101 members of **ACWUA** from 18 Arab countries – surpassing the goal set to have 100 members by 2014.

This year's conference has been organised under the heading of "New Prospects and Challenges for the Water Sector in the Arab Region" and aims to highlight challenges in the Arab water sector and discuss potential solutions under three topics. These include: utilities effectiveness and efficiency; innovative technologies and the private sector and also water science for policy and governance.

Water is increasingly becoming a binding constraint on **MENA development**. According to the Arab Development Challenges Report 2011 by UNDP; available renewable fresh water resources per capita in the Arab world are among the lowest worldwide.

Threatening levels of water stress exist in the Occupied Palestinian Territories and Yemen, while significant stress exists in Saudi Arabia and Jordan. The latter is an apt host country to discuss such challenges, with many quoting Jordan as the third most water scarce country worldwide.

During the keynote address, H.E. Dr Abdelqawi Khalifa, Minister of water and wastewater utilities in Egypt, emphasised the importance of the three elements of water provision: regulators, providers and recipients of water services.

"There is no doubt that the rights of citizens is to have a healthy life by drinking clean water," he said, before adding: "If we are doing this in a proper way it will be reflected in all aspects of our daily life…water and **wastewater** remain priorities for our government."

H.E. Dr Khalifa said that in terms of sanitation coverage in Egypt, 50% of the population is covered, while the remaining 50% without access are mostly based in rural areas. The government is

addressing this by creating "hot spots" as priority areas in the country. A reduction in unaccounted for water was also cited by the Egyptian Minister as a target in Egypt.

The topic of cross-border water sharing across the MENA region was raised during the conference opening.

Addressing delegates, Her Royal Highness Princess Sumaya bint El Hassan, President of El Hassan Science City and the Royal Scientific Society, said: "Managing the scarce resource of water is one of the most important issues…these issues should be considered every week of the year and not just during this week.

HRH Princess Sumaya added: "Water is transboundary and there should be a fundamental movement of water across borders."

Later in the conference, Hussein Al Atfy, secretary general of the Arab Water Council, said: "Cohesion and integration by countries to share water is not a choice, it's a must."

The three-day conference taking place on 27-31 January in Amman will include 70 presentations across 14 sessions, with the Arab Trade Fair taking place at the same time.

"Water sharing across MENA raised at Arab Water Week 2013", 27/01/2013, online at: http://www.waterworld.com/articles/2013/01/water-sharing-across-mena-raised-at-arab-water-week-2013.html?cmpid=$trackid

BACK TO TOP

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❖ 'New water economy must check energy demand'

In 18 months, desalination will provide enough water for 80% of Israel's urban drinking needs, experts say at CleanTech symposium.

As the Israeli water management and treatment industries continue to grow, it is crucial to ensure that all facilities operate with maximum efficiency, to prevent the loss of valuable energy, experts agreed at a conference at the Tel Aviv Fairgrounds on Tuesday.

Water professionals and government officials were speaking at the Energy-Water Nexus Symposium, held within the CleanTech 2013 – 17th Annual International Summit and Exhibition.

"Israel is emerging from times of crisis in the area of water into stability," Energy and Water Minister Uzi Landau said. "We have no only continued what has started in the past to develop desalination plants, but we are now building new and we have extending and developed those that already exist."

With those developments, however, come large energy requirements to power the desalination plants and sewage treatment facilities that are changing the face of the Israeli water economy.

Operating energy production plants also involves the use of plenty of water, the experts explained.

"It is clear to everyone that there is cross-influence between energy and water," said Oded Distel, director of the Investment Promotion Center at the Industry, Trade and Labor Ministry and head of the Israel NewTech program there.

Distel went on to add agriculture and food security to that synergetic list, saying that with every project in any of these categories, entrepreneurs must take under consideration the effects the plans will have on all of the other components.

"The solutions are there to meet our water needs," said Dr. Glen Daigger, president of the International Water Association and senior vice president and chief technology officer of US-based

water firm CH2M HILL.

"The issue is that in many of those it takes more energy to produce that additional water in different ways," he added.

While population growth, higher living standards, climate change and urbanization across the world have contributed to a "global water crisis," solving that water crisis must occur in an environmentally friendly way, with a reduced net amount of energy consumed, Daigger said.

Israeli water pumping used 3,200 gigawatt-hours in 2012, with 1,830 of these gigawatt-hours being consumed by Mekorot National Water Company pumps, said Dr. Yigal Kadar, manager of Mekorot's energy department.

While 3,200 gigawatthours may seem small compared Israel's total annual electricity consumption of 57,100 gigawatt-hours, the amount consumed by pumps is expected to rise to 10,700 gigawatt-hours by 2050 as water needs increase, Kadar explained.

The company is therefore continuously seeking methods to improve pump efficiency and make sure its more than 3,000 pumping units have good energy performance, he added.

Although many people criticize the increased deployment of desalination facilities due to their heavy energy requirements, the effici ency of these facilities can be improved with large, energy- saving pumps, according to Prof. Rafi Semiat, dean of chemical engineering at the Technion-Israel Institute of Technology in Haifa.

In the early days of desalination on cargo ships in the 19th century, evaporation of water consumed about 650 kilowatt-hours per cubic meter, but at today's Ashkelon facility, reverse osmosis mechanisms require only about 3.5 kilowatt-hours per cubic meter, Semiat said.

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In the early days of desalination on cargo ships in the 19th century, evaporation of water consumed about 650 kilowatt-hours per cubic meter, but at today's Ashkelon facility, reverse osmosis mechanisms require only about 3.5 kilowatt-hours per cubic meter, Semiat said.

In about a year-and-a-half's time Israel will produce roughly 600 million cubic meters of desalinated water per year, covering about 80 percent of urban drinking water and requiring about 1.36% of the country's energy supply, Semiat explained.

Today, about 40% of energy consumed here goes to electricity, 43% to fuels, 13% to Palestinian needs and 3% to solar water heaters, he said.

"We can invest in more equipment, more membranes to reduce the pressure we are working in," he said of desalination processes, noting, however, that this would be expensive.

"You have to remember one important point – water is still the cheapest product on Earth," Semiat continued.

"And still there are people who claim this is too much for them, and they are right."

"New water economy must check energy demand"', 30/01/2013, online at: http://www.jpost.com/Sci-Tech/Article.aspx?id=301576&utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=af89251437-RSS_EMAIL_CAMPAIGN&utm_medium=email

BACK TO TOP

❖ The (successful) politics of West Bank water

Israel and the PA have been quietly cooperating to ensure a safe, clean, and water-ful environment west of the Jordan River

While politicians in Israel and the Palestinian Authority continue their on again/off again posturing and peacemaking, some facts on the ground are bringing Israelis and Palestinians closer together — notably when it comes to environmental issues.

Quietly, Israel and the PA have been cooperating extensively to preserve the environment of the entire land mass west of the Jordan River, according to a top water engineer from a large Palestinian-controlled city in the West Bank. The PA needs and wants Israel's help in keeping water clean, expanding agricultural opportunities for farmers, and ensuring safe disposal of waste and trash, the engineer said.

Attending the 17th annual International Cleantech Business Forum in Tel Aviv this week along with about a dozen other PA engineers and municipal officials, "Amar" (who asked that his real name and employer's name not be used in this article) told The Times of Israel that everyone in the PA, without exception, had nothing but admiration for Israel's accomplishments in technology, especially water and agricultural tech. "We want and need the advanced systems that Israel has developed to preserve the environment and to enhance agricultural output. We are neighbors, and we share the same environment, so it is to both our advantages that we cooperate on these issues."
Far from the limelight, said Amar, Israel and the PA have developed numerous joint projects to tackle environmental problems. "For example, this June a new sewage treatment facility in Emek Hefer will come on line, which will be connected to sewage flow from Tulkarm, Jenin, and other West Bank towns."

The project is actually the completion of a long-standing effort by officials on both sides of the Green Line to do something about the wastewater from PA cities which had for years choked and threatened to destroy the Alexander River, which flows near Netanya. The project required extensive

cooperation between Israel and the PA, with contractors building cesspools, pipes, and other infrastructure. "Even during the wars [Operation Defensive Shield in 2002-2003, Operation Pillar of Defense last year] the cooperation continued," Amar said. The more, and higher quality, water available, the more West Bank farmers will be able to plant, and the higher their incomes and living standards will be. "That's good for everyone as well," Amar added.

Amar's comments presaged those of outgoing Water and Energy Minister Uzi Landau, who spoke a few minutes later at a symposium on water and energy at the Cleantech Forum. "Our neighbors are in great need," said Landau, citing the severe and chronic water shortage in Jordan, and the longstanding erosion of water resources in Syria that has forced many farmers off their land. "Water in the Middle East is becoming scarce, even more scarce than oil. Already, in the past, it has sparked war in the region."

While the water situation around Israel deteriorates, Israel, said Landau, has found the solution to its own water problems — and is ready and willing to export its knowledge and experience to any who seek it, include its long-time enemies. "Within a few years, there will be a 70% to 80% chance that the water coming out of your tap will be desalinated." Thanks to technology, Landau said, "Israel's water supply is now stable."

Already, Landau said, about a quarter of Israel's water economy is based on desalinated water, a figure that will reach 50% within two years; the goal is to raise that to 75% by 2020.

But desalination isn't the only area Israel excels in. "Already 75% of the water supplied to agriculture comes from recycled sewage and waste water. According to the UN, which has declared 2013 'The Year of Water,' there is no 'waste water,' only water that has not been recovered. The UN has called on nations around the world to aim for a 50% recovery rate of wastewater by 2025. In Israel we have a 95% recovery rate."

Israeli companies, concluded Landau, are the world leaders in desalination and sewage recycling. "And if our neighbors choose to seek our help, we will gladly provide it," Landau added.

For Amar, that invitation is nothing new. "We are just as interested in preserving water resources and having a clean environment as Israel, and we have done our share to preserve resources as well."

For example, Amar said, the PA has stopped drawing water from the badly-depleted Jordan River, even though it is entitled to a share, along with Jordan, according to the Oslo Accords. Instead, Israel has been compensating the PA with water from the National Water Carrier, which draws from the Kinneret, the Coastal Aquifer, and increasingly, from desalination plants.

Of course, no discussion of issues involving Israel and the PA can avoid politics, but for Amar, politics takes a distant second to practicalities, at least in the area of environmental cooperation.

"It is true that we are still under occupation," he said, somewhat apologetically, hesitant to offend the sensibilities of an Israeli in the heart of Tel Aviv. "One day the political issues will be worked out, but no matter what happens, we must continue to cooperate as equals," a situation, Amar added, that for the large part prevails right now.

In fact, as far as he is concerned, politicians should stick to their jobs and not get in the way of the water professionals. "Cooperation in these areas is good, and we have respectful relations with our Israeli colleagues on the basis of a common concern. Personally, I have no use for politicians, and I don't trust them, neither yours nor ours," said Amar. "I trust scientists and specialists. That's why I'm at this show."

"The (successful) politics of West Bank water",31/01/2013, online at: http://www.timesofisrael.com/the-successful-politics-of-west-bank-water/

BACK TO TOP

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❖ Water Authority: "Israel's Water Crisis Has Ended."

The water crisis has ended stated the director of the Water Authority, Alexander Kushnir. He said this would help the two other reservoirs for water desalination which are expected to come into play next year, as well as increased use of wastewater for agriculture restoration.

"Israel has stabilized after a period of long drought that lasted eight or nine years. We have developed a wastewater enhancement and rains of the past year have helped us. We are now in the phase of stabilization and preparation for the next decade," said the director in an interview Tuesday with Galei Tzahal radio.

He added that there will be a unexpected significant reduction in water prices for the consumer.

"Water Authority: "Israel's Water Crisis Has Ended."", 29/01/2013, online at: http://www.israelnationalnews.com/News/Flash.aspx/260919#.UQu4EB1dbbU

BACK TO TOP

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❖ Study warns against inaction over shrinking Dead Sea

AMMAN — The Dead Sea and its unique environment will witness continued deterioration if stakeholders of the Red-Dead project adopt a "no action alternative approach", a recent study concluded.

The World Bank-led study of alternatives, part of the Red Sea-Dead Sea Water Conveyance Study Programme, warned of the economic, environmental and social costs if the decline of the Dead Sea and the imminent deficit of potable water in Jordan are not addressed.

"With no action, the sea level is expected to drop by another 150 metres until it will stabilise as a much smaller water body at a level of about 543 metres below sea level by the mid 22nd century," the study indicated.

The study only provides a comparative analysis of alternatives to the Red–Dead project, not a recommended course of action for the beneficiary parties to follow, according to its authors.

"The 'No Action' alternative will lead Jordan to seek other ways to increase the supply of potable water. The most likely course of action is to desalinate in Aqaba and convey the desalinated water to Amman, possibly expanding the Disi-Amman pipeline (currently under construction) for water conveyance," the study said.

Noting that the progressive decline in the Dead Sea level has resulted in a retreat of the shoreline and dehydration of the shallow southern basin, the study said this has resulted in sinkholes, mud flats, steep slopes and earthquake-associated landslides.

"Not taking any measures to change the situation will cause the continued deterioration of the Dead Sea and its environment," the study warned.

Since the 1960s, the level of the Dead Sea has dropped by more than 30 metres and today it stands at 426 metres below sea level. The Dead Sea is currently declining by more than a metre a year and stabilising at the current level requires additional water inflow of 700-800 million cubic metres (mcm) per year, according to the study.

The Red-Dead project envisages transferring up to 2 billion cubic metres of sea water from the Red Sea to the Dead Sea annually.

Red-Dead project

The study, which is posted on the World Bank's website, examined the Red Sea-Dead Sea Water Conveyance Project and estimated the cost per cubic metre of water after its completion to range between $1.1 and $1.5.

Commenting on the project, the study indicated that an issue of a potentially major concern was the risk that the influx of seawater and rejected brine into the Dead Sea would change the appearance and water quality of the Dead Sea, damaging its value as a heritage site of international importance.

Jordan River rehabilitation option

Restoring the lower Jordan River is a desirable goal with high environmental, historical and cultural values, the study said, noting that full restoration to historic flows would also address the first objective of saving the Dead Sea but was not "economically or socially feasible at this time".

Full restoration of the water flow of over one billion cubic metres per year, based on recycled water, will become feasible in the long run, as the supply of potable water increases to meet the needs of the growing population, according to the study.

Transfer of Mediterranean Sea water

A northern alignment to transfer Mediterranean Sea water to the Dead Sea is not considered feasible, the study said, because its course would pass through fertile valleys that overlay sensitive aquifers and entail serious environmental risks associated with conveying salt water across tracts where groundwater is used for domestic and industrial purposes and to provide some vital complementary irrigation services.

Transfer of water from Turkey

"The reliability of supplies of potable water in Turkey is the key issue," the study said, noting that cost-effective wise, delivering potable water by land from Turkey doesn't seem to be competitive with well-installed and managed desalination systems located in the beneficiary parties.

Transfer of Euphrates River water

While a structure to convey reasonably high-quality water from the Euphrates River in Iraq would be technically and economically feasible, the volume of water (160mcm per year) proposed in studies undertaken in the 1990s would be too small even to address the volumes of potable water needed in the Jordan Basin, the authors of the study pointed out.

"Today, Iraq cannot spare any water from the Euphrates River as the flow has been significantly reduced as a consequence of water abstraction from the river in Turkey, Syria and Iraq."

Desalination options

The study team suggested five desalination and transfer options. The first proposes desalinating Mediterranean Sea water on the Mediterranean coast and transferring it to the Lower Jordan River and the Dead Sea region.

The study said the use of potable water for Dead Sea stabilisation would not be a viable or a desirable strategy as long as the beneficiary parties experience acute shortages of potable water.

The second option is to transfer Mediterranean Sea water to the Jordan Valley for local desalination.

"This alternative is problematic because the course of the water conveyance would pass through fertile valleys that overlay sensitive aquifers," the study concluded.

Meanwhile, the third and fourth options entail increasing the amounts of desalinated Mediterranean Sea water on the coast or desalinating Red Sea water in the Gulf of Aqaba and transferring it for use by the three beneficiary parties to reduce pumping from the Lower Jordan River.

The study also examined the Jordan Red Sea Project (JRSP), proposed by the Kingdom, as one of the options.

Although the JRSP is an alternative that was not included in the terms of reference for the study, the authors said it has become a well-known alternative in the last two years and would be a "Jordan only" initiative, not involving Israel or the Palestinian Authority.

Alternatives considered

The Dead Sea is now declining by more than a metre every year. Since the 1960s, it dropped by over 30 metres. It will continue shrinking at a faster pace if no action is taken to save it. Alternatives to save it include:

•Red Sea-Dead Sea Water Conveyance

•Jordan River rehabilitation

•Mediterranean Sea-Dead Sea Conveyance

•Transfer of potable water from Turkey by pipeline

•Transfer of potable water from the Euphrates River in Iraq by pipeline

•Desalination Options

"Study warns against inaction over shrinking Dead Sea", Jordan Times, 31/01/2013, online at: http://mideastenvironment.apps01.yorku.ca/?p=6774

BACK TO TOP

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❖ Israeli water firm launches US subsidiary

Tel Aviv-based "smart water" network software management firm, the Whitewater Group has established a subsidiary in the US.

A Tel Aviv-based "smart water" network software management firm, the Whitewater Group, has established a subsidiary in the United States called Whitewater Technologies US.

Founded in 2006 by Ori Yogev and Hana Gertler, the Whitewater Group focuses on administering water networks and monitoring quality of drinking water through advanced technological mechanisms. The new US subsidiary, to be based in the East Coast, formed with an investment of about $7 million and will focus on implementing and integrating the technologies into American water systems, the company said.

To effectively penetrate the US market, Whitewater has also signed a cooperation agreement with American engineering giant Tetra Tech, which specializes in complex design projects in water and environmental infrastructure, a statement from Whitewater said.

Whitewater has also recently begun installing an advanced management system in the water infrastructure of Boulder, Colorado that will enable realtime monitoring and analysis of water integrity. This project joins similar ones already completed by the company in Akron, Ohio and Philadelphia, Pennsylvania, the company said.

While the new American subsidiary will oversee operations in the US, the Israel-based Whitewater Technologies office will continue to administer company activities in Israel, as well as those in Asian-Pacific, European, African, Australian and Far East markets, the firm added.

"Israeli water firm launches US subsidiary", 28/01/2013, online at: http://www.jpost.com/Sci-Tech/Article.aspx?id=301329

BACK TO TOP

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❖ For Israel, droughts go down the drain

Water Authority credits desalination advances, more than this year's remarkably wet winter weather, for country's new water wealth

After years of constantly being urged to conserve water, the National Water Authority announced Tuesday that Israelis no longer need to fear droughts and that the country's water worries are essentially over.

The solution for the longstanding problem comes not from the clouds, which have provided generous amounts of rainfall this winter, but primarily from the sea — and the desalination technology that enables transforming its waters into something you can drink.

"Already we are desalinating 25 percent of our consumable water with the aid of three active plants. And with two more in the works, we will increase that amount to 50%. The drought that has plagued us in recent years is definitely over," said Avner Hermoni, CEO of Derech Hayam desalination.

"Sea of Galillee water levels are no longer an issue," added Danny Sofer, a regional director for the national Mekorot water company. He said that water from the northern lake now makes up only 10% of Israel's sources.

The Sea of Galilee — Lake Kinneret — has already collected enough water to reach its average yearly total, with over 330 days left to round out the total.

Thanks to the heaviest winter rains Israel has seen in decades earlier this month, the lake hit the 1.57 meter mark late last week — the average yearly intake — raising it to 210.84 meters below sea level, the highest it's been since 2006, and only two meters below the level at which water would have to be let out.

The technological advances, together with the wet weather, have led the Water Authority to nix its water conservation campaign after running it for years.

"You can now shower alone," Sofer joked, though he added that wise use of water is always sound policy.

Unfortunately for the public, being wealthy in water hasn't yet translated to cheaper prices. Desalination is expensive, and on January 1 the price of water increased by 3 percent for the first 3.5 cubic meters per person in the household, bringing it to NIS 9.09 ($2.43).
Beyond the allocated 3.5 cubic meters, water costs NIS 14.60 per cubic meter. The price increases adds up to a total 36% increase since 2010.

"For Israel, droughts go down the drain",31/01/2013, online at: http://www.timesofisrael.com/for-israel-droughts-are-all-washed-up/

BACK TO TOP

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❖ EnGlobe to Decontaminate Kishon River in Israel

Quebec City-based EnGlobe has been awarded an environmental service contract by the state of Israel to rehabilitate the Kishon River in Haifa Bay, Israel.

The contract, valued at over $40 million, is 36 months long and will provide decontaminating services to Kishon Drainage and Rivers Authority and the Ministry of Environmental Protection.

The service provided by EnGlobe will decontaminate over seven kilometres of the Kishon River which flows into Haifa Bay.

With EnGlobe's Biopile technology, EnGlobe and its Biogenie division will decontaminate over half a million cubic metres of sediments, and will supervise the construction of the future recreational and ecological park in Haifa.

More than 220,000 shekels ($58,000 CAD) will have been invested to improve the water quality and convert the former industrial zone into an area for local residents.

"EnGlobe to Decontaminate Kishon River in Israel", 31/01/2013, online at: http://watercanada.net/2013/englobe-to-decontaminate-kishon-river-in-israel/

BACK TO TOP

❖ Israeli water firm drying up Palestinian springs, says UN report

The Israeli national water company Mekorot undermines Palestinians' access to water, according to a new report commissioned by the United Nations Human Rights Council.

The report finds that deep water drillings by Mekorot and the Israeli agri-industrial firm Mehadrin in the occupied Jordan Valley have caused the drying up of Palestinian wells and springs. About 80 percent of all water drilled in this area is consumed by Israel and its illegal settlements in the West Bank.
Mekorot took over responsibility for the West Bank's water resources from the Israeli military in 1982. The new report documents a clear pattern of discrimination against Palestinians. Whereas Palestinians living in most of the West Bank face "chronic shortages," Israeli settlements enjoy a constant supply of water. Palestinians are prevented from using wastewater provided to Israeli settlements for irrigation and instead have to rely on more expensive water for that purpose. Furthermore, valves supplying Palestinians tend to be cut off when water shortages occur, yet no such restrictions are applied to the use of water by Israeli settlers.

The World Health Organization recommends that each individual should have access to 100 liters of water per day. Israeli settlers in the West Bank typically consume 400 liters per day, the report states, while Palestinians have to make do with just 73 liters or, in the case of Palestinian Bedouins, as little as 10 liters.

Hampered

The new UN report is the result of a mission investigating Israeli settlements in the West Bank, including East Jerusalem. Israel tried to hamper field visits to Israel and the West Bank by the mission, led by French magistrate Christine Chanet, by ignoring five request for cooperation. However, the mission succeeded in obtaining first-hand information during meetings held in Jordan. The report highlights the role of businesses in Israel's settlements.

Information gathered by the mission shows that private firms have enabled, facilitated and profited, directly and indirectly, from the construction and growth of the settlements. It identified a number of business activities that raise particular concerns about abuses of human rights. They include:

• The supply of equipment and materials facilitating the construction of settlements and Israel's wall in the West Bank;

• The supply of surveillance and identification equipment for settlements, the wall and military checkpoints;

• The supply of equipment for the demolition of housing and property, including the destruction of farms, greenhouses, olives groves and crops,;

• The supply of security services, equipment and materials to businesses operating in settlements;

• The provision of transport and other services to support the maintenance of settlements;

• Banking and financial operations helping to develop, expand or maintain settlements and their activities, including loans for housing and business development;

• The use of natural resources, in particular water and land, for business purposes;

• Pollution, dumping and transfer of waste to Palestinian villages;

• The way Palestinian financial and economic markets are held captive by Israel, as well as practices that disadvantage Palestinian businesses, including through restrictions on movement, and administrative and legal constraints.

Fully aware

According to the new report, companies active in the settlements are fully aware that they are abusing international law and contributing to violations of human rights.

Industrial parks in settlements, such as Barkan and Mishor Adumim, are criticized for enticing firms to the settlements with tax sweeteners and by emphasizing how Palestinians are paid lower wages than Israeli workers. Economic activities in these zones are growing, the mission adds.

The mission also notes that a number of banks provide mortgages for homebuyers and special loans for building projects in settlements. In some cases, the banks are physically present there.

It also states that Israel labels all its export products as originating from Israel, including those wholly or partially produced in settlements. Some companies operating in settlements have been accused of hiding the original place of production of their products. This poses problems for the customs authorities of other countries, as well as raising issues in relation to consumers' right to information.

The mission urges private companies to cease operating in the settlements.

The report should prove useful for activists pushing for boycott, divestment and sanctions against Israel. It states plainly that firms active in the settlements are facilitating abuses of human rights.

"Israeli water firm drying up Palestinian springs, says UN report", 01/02/2013, online at: http://electronicintifada.net/blogs/adri-nieuwhof/israeli-water-firm-drying-palestinian-springs-says-un-report

BACK TO TOP

❖ Israeli counsel looks to high-tech innovations in farming, water and defense to bolster Arizona trade

Israeli Counsel General David Siegelvisited the state this week promoting new technology and investment opportunities in some traditional sectors — farming, defense and water resources.

Siegel touted Israel's water-conservation efforts and high-tech agriculture and how it can be used by Arizona farmers and American Indian reservations. He spoke before the newly formed Arizona Israel Business Council today in Phoenix.

The Israel diplomat — who is based out of Los Angeles — said the Middle East has developed very sophisticated farming and water-reclamation techniques because of the region's arid climate and geography.

"It's all computerized and very sophisticated. It's very high-tech. It's not low-tech at all," Siegel said of Israel's agriculture sector.

That includes using unmanned aerial systems and drones to survey and track fields and crops.

Arizona is looking to become a UAV and drone research and development hub for the U.S.

Siegel said two-thirds of the water used for farming in Israel is recycled, and the country reclaims and recycles 80 percent of its used water. That is the highest of any nation.

Agriculture is a big industry in Arizona with crops such as lettuce, citrus and cotton, but water always has been a challenge in the desert Southwest.

Native American tribes in the state are looking to improve their water infrastructure and find new economic development opportunities beyond gaming.

Siegel acknowledged current tensions and upheavals in the Middle East with political changes in Egypt and Libya, civil war in Syria and worries over Iran's nuclear program. He said the Middle East geopolitical climate is part of what drives Israel's technology and investments in a host of areas beyond defense.

"It probably drives our innovation," Siegel said.

Siegel met with the AIBC and also has had meetings with Arizona congressional members, Arizona State UniversityPresident Michael Crow, Raytheon Missiles Systems executives in Tucson, as well as Navajo Nation leaders. Representatives from the Salt River Pima Maricopa Indian Community and

Gila River Indian Community also were at today's AIBC meetings in Phoenix held at the law offices of Greenberg Traurig LLP.

The AIBC is being formed by Jonathan Breakstone. Breakstone wants to link more Arizona businesses, investors and entrepreneurs with counterparts in Israel via AIBC.

Trade representatives from the United Kingdom were in the Valley earlier this week hosting a reception at the Arizona Biltmore Resort & Spa for investors and business executives.

Siegel also talked about medical, technology and defense links between Arizona and Israel — old and new.

Raytheon's Tucson division is doing work for Israel's next generation missile defense system called David's Sling.

Israel Defense Forces deployed the existing Iron Dome missile defense system during last year's clashes with Hamas and other Palestinian forces in Gaza.

Boeing Co. makes Apache helicopters for Israel at its plant in Mesa. A Boeing representative at the AIBC meeting said the aerospace company has sent $500 million worth of Apaches to Israel over roughly the past decade.

Arizona companies have exported about $2 billion worth of goods to Israel over the past 10 years. State exports to Israel totaled $148 million in 2011, according to the U.S. Commerce Department. That ranks 19th among state export markets.

While Israel has a high-tech economy with strong ties to U.S. and its technology, health care and defense sectors, its neighbors in the Palestinian territories economically are isolated and challenged. Gaza has a 40 percent unemployment rate as Israel and Hamas have skirmished. The West Bank and Gaza combined have an $8 billion GDP, according to U.S. government figures. Israel has a $248 billion GDP.

"Israeli counsel looks to high-tech innovations in farming, water and defense to bolster Arizona trade", 01/02/2013, online at: http://www.bizjournals.com/phoenix/news/2013/02/01/israeli-counsel-looks-to-high-tech.html

BACK TO TOP

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❖ Can 'nexus thinking' alleviate global water, food and energy pressures?

With demand for the world's three most precious resources only set to grow, a new approach must be put into action

With the world population growing at a rate of around 80 million people a year, it is estimated that by 2030 the world will need 30% more water, 40% more energy and 50% more food. That's not just to feed, water and power the new arrivals, but also those currently living "off grid" in developing countries as they rise out of poverty.

In the past, water, food and energy have too often been dealt with as separate issues. Biofuels are a classic example. Once the great hope for sustainable energy, bio-diesel's insatiable appetite for wheat saw global food prices spike in 2008 and 2011, causing civil unrest. Panicked into action, the international community spoke out at the German government's Bonn 2011 conference and the water-food-energy nexus.

What is nexus thinking?

The nexus is a recognition that any solution for one problem, for example water, must equally consider the other two in the nexus. Jeff Erikson, senior vice president at environmental consultancy SustainAbility, explains: "Water is required all the way through the lifecycle of electricity and power generation, from fuel extraction to production; electricity is required to move and process water, while agriculture accounts for 70% of the freshwater consumption worldwide. One is dependent on the other, and the demand for all three is going to continue to grow.

"Then you put climate change on top of that, which is going to have a significant impact on both agriculture and water availability, and you can see how things will continue to get squeezed over the next number of decades."

From the World Economic Forum in Davos, Jon Williams, partner, sustainability and climate change at PricewaterhouseCoopers (PwC), says unsustainable resource consumption can only get worse without the nexus. "Water is pretty much used for everything that we do and is already becoming scarce in large parts of the world; the more energy we use, the more water we need to cool power stations ... [And] If the whole world ate like Europeans or Americans there would be no way there would be sufficient food, let alone the water to grow it. The three competing pressures [water, food, energy are] pulling in completely the wrong direction at the moment."

China as a case study

China is an interesting case study. Professor Declan Conway of the UEA Water Security Research Centre has extensively researched water and energy use in the world's most populous country: "Many of the pressures we're talking about globally are all occurring within China," Conway says.

"It is the world's second largest irrigator, using a huge quantity of water for growing of crops, much of which is pumped from underground – and that requires a lot of energy. We recently found that 0.5% of China's total emissions come simply from the pumping of groundwater for irrigation."

Potential responses to these issues are still in their infancy, but China's next five year plan includes planning goals for energy efficiency and emissions, food production and water use, including "how much water goes into growing a particular crop," says Conway. "A lot of effort has gone into softening the blow on agriculture while incentivising much more efficient use of water."

But these are not strident solutions. China is currently pumping water out of the ground at a rate of 20 cubic kilometres per year faster than nature can replenish. Worse still is the US at 30 cubic kilometres, and India at 190 cubic kilometres.

Policy has yet to catch up with the rhetoric of international conferences, argues Jeremy Allouche, research fellow at the Institute of Development Studies. "The problem with the nexus at the moment is it hasn't led to any policy concepts ... and it hasn't led to key players taking it forward," he says.

Aligning policy with action

There is a perverse positive: our current usage of water, food and energy is so outrageously inefficient that improvements are not hard to find. "The sad fact is that anywhere between 10-15% of the food we produce ends up in waste," says Williams, who in part blames agricultural subsidies. "It's quite scandalous that a society produces more food than it can actually reasonably eat. Equally, he continues, "if you look at individual buildings there are examples of 25-75% reductions in energy use by simply insulating."

When domestic and industrial use of freshwater only account for 8% and 22% accordingly, compared to 70% by agriculture, it may seem that individuals and business are relatively powerless. However, not according to the nexus. "The energy associated with other uses of water can be quite high", says Conway.

"The need to pump and deliver water and to treat it to drinking water standards, can be far higher than the energy requirements associated with agriculture. So although the volumes are different, the energy use can be much higher per unit of water."

Meanwhile, biofuels may be set to make a comeback. Jesper Hedal Kløverpris is sustainability manager at Danish biotech company Novozymes, producer of the enzymes needed to make cellulosic ethanol. "What's interesting in relation to the food-water nexus is we make cellulosic ethanol simply by taking the residues – or waste – from the existing agricultural system," says Kløverpris. "It has a big potential for producing energy without additional agricultural water use."

In theory, while ears of corn are harvested for food – and previously for bio-ethanol – only waste stems are needed by bioethanol refineries, hungry for the cellulose and hemicellulose normally

discarded, rather than the starch and protein. Large bioethanol refineries have already appeared in Italy, Brazil, the US and China. Research by Bloomberg New Energy Finance found that by 2030, this has the potential to replace more than 50% of gasoline consumption in some countries. "That gives an indication of the potential", says Kløverpris. And as for the water intensity of bio-refineries and the greenhouse gases emitted by the process, he admits the "science is still progressing", but cites recent studies that have found in favour of cellulosic ethanol versus gasoline.

One thing the nexus highlights is that an awful lot needs to be done in the next two decades and an awful lot faster than it currently is happening.

"We are profiling the need to make these linkages much more than we were", says Conway. "Whether we are making a lot of progress in actually getting there and making those linkages, I'm less sure ... We're still on a trajectory of rapid change that has huge implications for consumption patterns, energy use, the land needed to provide crops."

It's time for nexus thinking to make way for nexus action.

“Can 'nexus thinking' alleviate global water, food and energy pressures?”,25/01/2013, online at: http://www.guardian.co.uk/sustainable-business/nexus-thinking-global-water-food-energy?CMP=twt_gu

BACK TO TOP

❖ China Threat to Water Security

Asia requires a ruled-based system to manage its water resources and maintain rapid economic growth in the region but China appears to be a stumbling block, experts say.

China does not have a single water sharing treaty in place with any of its neighboring countries, refusing be tied up by a regional regulatory framework and fearing it will lose its strategic grip on transboundary river flows, the experts told a Washington conference.

"Without bringing China on board, it is impossible to establish a rules-based water regime in Asia, given the centrality of China," said Brahma Chellaney, a professor at the Centre for Policy Research in New Delhi.

This could not only affect the future of water resources in the region and dampen economic outlook for Asia, but also lead to regional conflict, he warned.

Nearly all of China's neighbors have forged water agreements among themselves but not one of them has a water agreement with the Asian giant.

Chellaney acknowledged that it would be difficult to convince Beijing to consider negotiating a regional agreement, saying its key location as the source of much of the region's water gives it little reason to share resources with its neighbors downstream.

"There is no other country in the world that comes close to the hydro-supremacy that China has established," Chellaney said. "[But] cross-border dependency on water flows is high across Asia."

"The fact that most Asian countries are dependent on cross-border flows to a significant degree, makes water cooperation central to ensuring Asian peace and stability," he said.

"The question is how does one bring China on board?"

Internal crisis

The experts also warned about a simmering water crisis within China.

As China struggles with maintaining the sustainable growth of its economy and urbanizing some 300 million people in the next 20 years, tremendous strains have been placed on the country's resources, they said.

Jennifer Turner, director of the China Environment Forum at the Woodrow Wilson Center in Washington, said Beijing is diverting massive amounts of water to mineral abundant areas in the north of the country that lack sufficient rainfall in order to support continued reliance on coal as a its main source of energy.

Relocating huge amounts of water for the sake of power production in China is having profound effects on the availability of the resource within the country and elsewhere throughout the region, Turner said.

"We estimate that 20 percent of China's water is going just to the coal sector," she said. Water is used to cool China's coal plants and wash mined coal for processing.

"The pressure in China is energy security, but … energy security at the expense of water security."

Some 70 percent of electricity generation in China uses coal power and that is set to double by 2020, Turner said.

"Coal appears to remain the king in China and this is important for you to think about water security in China," Turner said.

She added that growing cities across China are driving demand for energy for which coal in the north of the country is key.

"[A]nd they can get to it if they can get the water."

If coal is "king" in China, Turner said, hydropower is "queen"—a technology which has led the country to build dozens of dams across its rivers, many of which run from sources on the Tibetan plateau to Asian neighbors downstream.

Increased demand

Chellaney said that runaway growth in the greater Asian region has significantly increased the demand for water in the driest continent in the world.

The world's fastest growing demand for water for industrial and food production and for municipal supply is in Asia, he said.

But he said that such growth is unsustainable without a mix of international regulation and more efficient infrastructure to avoid a water crisis.

"Asia's water crisis is assuming such critical proportions that without mitigating this crisis, Asia's continued economic growth will not be possible," Chellaney said.

"Water scarcity and rapid economic growth do not go hand in hand, and how Asia manages its water crisis will very much shape its security and economic future," he said.

Turner said that another risk for the region's water supply is the example China is setting by building massive dams without considering the interest of its downstream neighbors.

"I think that what you see in China in terms of this rapid dam building is just replicated [for example] in the Mekong River basin," she said, pointing to recent plans by Laos to proceed with a megadam on the Southeast Asian river upstream from Thailand, Cambodia and Vietnam.

The Mekong River Commission (MRC), an intergovernmental body including Cambodia, Laos,

Thailand, and Vietnam which manages development along Southeast Asia's main waterway, ruled last year that the dam required further study, but Laos has decided to proceed with the project.

China has refused to join the MRC, although the Mekong's source is located within its borders, saying it prefers to negotiate with other countries on a bilateral basis.

In addition to teaching other nations that it is acceptable to act without consulting their neighbors, Turner said, Beijing legitimizes its own actions when others in the region follow its example.

"All the other countries are doing the same thing … The model goes all the way down … So I think that when China looks at that, they say, 'everyone is doing the same thing, right?'"

"China Threat to Water Security", 25/01/2013, online at: http://www.rfa.org/english/news/china/water-01252013184148.html

BACK TO TOP

❖ China announces a slew of dams on Brahmaputra and Salween

DHARAMSHALA, January 31: India today said it will take a "considered view" on reports of China's plans to construct upstream dams on the Brahmaputra River, while conceding that New Delhi is yet to get details on the latest plans.

"We will take a considered view about that," Defence Minister AK Antony said while adding that the government was yet to get details of China's plan.

Reports on Wednesday suggested that China has approved the construction of three new hydropower dams on the middle reaches of the Brahmaputra river, after a two-year hiatus.

According to The Hindu, the three new dams were approved by the Chinese State Council under a new energy development plan for 2015 that was released on January 23.

China began construction on one major hydropower dam on the main stream of the middle reaches of the Brahmaputra – a 510 MW project in Zangmu in 2010.

"A 640 MW dam will be built in Dagu, which lies 18 km upstream of Zangmu. Another 320 MW dam will be built at Jiacha, also on the middle reaches of the Brahmaputura downstream of Zangmu. A third dam will be built at Jiexu, 11 km upstream of Zangmu. The capacity of the Jiexu dam is, as yet, unconfirmed," the report cited the plan as saying.

The plan said the government "will push forward vigorously the hydropower base construction."

China has long argued that its dams are run of the river designs, therefore would not be affecting the flow of the water to the lower riparian regions.

India has been raising its concerns on this issue during the bilateral meetings.

The Indian Ministry of External Affairs yesterday said that it was keeping a close watch on China's construction plans.

Brahmaputra flows in Tibet as the river Tsangpo, entering India in Arunachal Pradesh and emptying into the Bay of Bengal through Bangladesh.

The energy development plan also announced a controversial decision to build a cascade of 13 dams on the Salween – China's last free-flowing river – stalled nearly a decade ago under opposition from environmental groups and outgoing premier Wen Jiabao.

The river, also known as the Thanlwin, begins on the Tibetan plateau and winds through Thailand before ending in a Burmese estuary. Its headwaters support 5 million people from 13 ethnic groups, many of whom are subsistence farmers.

Critics say that the project will displace about 40,000 people, submerge about 20 miles of arable land and destroy endangered fish species.

"China announces a slew of dams on Brahmaputra and Salween", 31/01/2013, online at: http://www.phayul.com/news/article.aspx?article=China+announces+a+slew+of+dams+on+Brahmaputra+and+Salween&id=32957

BACK TO TOP

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❖ China provokes india again, restarts construction of dams on Brahmaputra

New Delhi: China has approved construction of three more projects on the Brahmaputra River. The decision came after a two year lull in construction activities on the Brahmaputra River.

The dams are supposed to be complete by 2015, according to a news report published in a leading daily.

Construction on one of the three dams has already begun. The dam is being constructed on the middle reaches of the river, known in China as Yarlung Zangbo. The dam is expected to assist in power generation through 510 MW hydropower project in Zangmu in Tibet Autonomous Region (TAR).

Work on other two power projects is expected to begin shortly. One is a 640 MW dam and will be constructed 18 km upstream of Zangmu. The third power project is comparatively low yield, 320 MW dam being built at Jieux, 11km upstream of Zangmu.

The construction of dam will affect the availability of water in the Indian Territory. The construction of the dam will affect the water to India, a charge denied by the Chinese government.

According to Chinese scientists, the Brahmaputra River originates from Angsi Glacier, located on the northern side of the Himalayas in Burang County of Tibet. The river is 3,848 km long and its drainage area is 712,035 square km, says a study conducted last year.

From Tibet, it flows to India and from there on to Bangladesh. India and China have an agreement to exchange data on water flows of Brahmaputra River.

"China provokes india again, restarts construction of dams on Brahmaputra", 30/01/2013, online at: http://daily.bhaskar.com/article/WOR-TOP-china-begins-construction-of-dam-on-brahmaputra-after-2-years-4163755-NOR.html

BACK TO TOP

❖ Gujarat water policy may be delayed

While National Water Resources Council (NWRC) has adopted National Water Policy (NWP), Gujarat Government is likely to wait for Centre to confirm NWP before finalising the state water policy.

Sources in the state government have indicated that as water is a state subject, the state government had already made a draft of its water policy. Following adoption of NWP by NWRC on December 28, 2012, experts said that there were many flaws in NWP and it also had some controversial points.

"National Water Policy has been just adopted by the NWRC, but adoption doesn't mean finalisation of the policy. It needs to be approved by the prime minister. However, water is a state subject and this policy has many flaws in it. For instance, while it is claimed that all the stakeholders have been consulted but most important stakeholders — farmers —have not been consulted. Apart from this, the policy is proposing to consider water as an economic good, which may be very controversial, as it may lead to big-time commercialisation of water," said a source in the state government.

"Though we have our draft of water policy almost ready, now we will have to wait for the union government to finalise the national water policy. Once the national policy is finalised, we will need to redraft our state's water policy," he said.

"There are some controversial phrases in the national water policy. We will need to reconsider all those issues in context of Gujarat's water situation. So state's water policy is likely to be delayed," said the source.

state govt is awaiting approval of nat'l water policy

"Gujarat water policy may be delayed", 30/01/2013, online at: http://www.dnaindia.com/india/report_gujarat-water-policy-may-be-delayed_1793841

BACK TO TOP

❖ WAPDA to start constructing three dams

Lahore: The Water and Power Development Authority (Wapda) has decided to start the construction work on three hydropower projects in a couple of months as all pre-requisites for initiation of the projects are complete.

With a cumulative generation capacity of about 1,540 megawatts (MW) and gross water storage capacity of 250,000 acre feet, these projects include two hydropower projects namely Tarbela fourth extension and Keyal Khwar, and one energy generation and water storage plan, under which 26 projects capable of producing 21,000MW and storing 13 million acre feet (MAF) of water are in various phases of implementation.

The 1,410MW-Tarbela fourth extension project is being undertaken as the fourth extension of the Tarbela hydel power station. Three generating units of 470MW each will be installed to enhance the capacity of the Tarbela power station to 4,888MW from 3,478MW. The annual energy contribution of the Tarbela fourth extension project has been estimated at 3,480 million units. The World Bank is providing $840 million for the project.

Keyal Khwar Dam is located in Khyber-Pakhtunkhwa. With a power generation capacity of 122MW, the dam's annual energy contribution is estimated to be 426 million units with estimated annual benefits of about Rs3.5 billion.

"WAPDA to start constructing three dams", 30/01/2013, online at: http://tribune.com.pk/story/500472/wapda-to-start-constructing-three-dams/

BACK TO TOP

❖ Boom in Mining Rare Earths Poses Mounting Toxic Risks

The mining of rare earth metals, used in everything from smart phones to wind turbines, has long been dominated by China. But as mining of these key elements spreads to countries like Malaysia and Brazil, scientists warn of the dangers of the toxic and radioactive waste generated by the mines and processing plants.

In November, the first shipment of raw "rare earth" minerals arrived at an $800 million processing plant on Malaysia's east coast near the home of Tan Bun Teet. The plant, run by Australia's Lynas Corporation, has since begun refining the rare earth metals, essential components in wind turbines, hybrid cars, smart phones, cruise missiles, and other high-tech products. Once fully operational, the plant would become the world's largest processing facility of rare earths, breaking China's near-monopoly on producing the prized elements.

But Tan and others in the region are concerned that the Lynas Advanced Materials Plant, known as LAMP, will be plagued by the severe environmental problems that have been the hallmark of rare earths processing plants in China and, more than two decades ago, in Malaysia itself. The plant lies in an industrial zone atop reclaimed swampland, just 12 miles from Kuantan, a city of 600,000. The chief worry is that the rare earth elements are bound up in mineral deposits with the low-level radioactive element thorium, exposure to which has been linked to an increased risk of developing lung, pancreatic, and other cancers.

"We are not against rare earths processing," says Tan, a retired schoolteacher who leads a citizens' group opposed to the plant. "We're only against the inappropriate choice of site, and the way they're going to keep the waste." Tan echoes scientists' concerns that the plant's toxic wastewater will leach into groundwater, and that its storage ponds are vulnerable to the monsoons that slam the swampy coastline every autumn.

As global demand has surged in recent years for rare earth elements, fears have grown that China, which accounts for more than 95 percent of rare earths output, will withhold supplies, as it did temporarily two years ago during a dispute with Japan. As a result, across five continents and numerous countries — including the United States, Brazil, Mongolia, and India — rare earth

processing projects are being launched or revived. With them comes the potential threats to the environment and human health that have plagued China's processing sites.

"As the world's hunger for these elements increases... the waste is going to increase," says Nicholas Leadbeater, a chemist at the University of Connecticut whose research focuses on developing green technologies. "The more mines there are, the more trouble there's going to be." To avoid such problems, Leadbeater says some researchers are now looking into ways of recovering rare earths from existing products, and of manufacturing products capable of running without rare earths. Toyota, for example, is developing an electric motor that does not use rare earths in its battery, as most currently do.

Contrary to their name, the 17 rare earth elements are relatively common — their rarity comes from the labor involved in separating them from surrounding rock. The process requires a cocktail of chemical compounds

Market pressures for cheap rare earths may lead managers to skimp on environmental protections.

and produces a "tremendous amount" of solid waste, according to the U. S. Environmental Protection Agency. China's rare earths mines have used only a fraction of the world's total supply, and substantial untapped reserves are found in Australia, the United States, parts of the former Soviet Union, and other countries. Global demand for rare earths dipped last year on the heels of a speculative bubble, but the EPA said in December there is a "high likelihood" that some of the elements will be in short supply by 2014.

In California, Molycorp Minerals recently reopened a rare earths processing operation that it abandoned in 2002 near Death Valley, after retooling its operation to meet environmental concerns over contaminated groundwater. In Brazil, mining giant Vale is considering whether to process rare earths at a copper mine in the Amazon. India recently agreed to export rare earths to Japan, and a Toyota subsidiary is preparing to mine rare earths in Vietnam. In Greenland, several companies are preparing to mine and process that island's abundant rare earth resources, which will become more accessible as Greenland's ice sheet continues to melt.

All of these projects, however, must come to grips with the toxic and radioactive legacy of rare earth mining. Scientists say under-regulated rare earths projects can produce wastewater and tailings ponds that leak acids, heavy metals and radioactive elements into groundwater, and they point out that market pressures for cheap and reliable rare earths may lead project managers to skimp on environmental protections.

In Malaysia, Mitsubishi Chemical is now engaged in a $100 million cleanup of its Bukit Merah rare earths processing site, which it closed in 1992 amid opposition from local residents and Japanese politicians and environmentalists. It is one of Asia's largest radioactive waste cleanup sites, and local physicians said the thorium contamination from the plant has led to an increase in leukemia and other ailments. The legacy of that project has led many Malaysians to be wary of rare earths mines.

Few independent studies chart the industry's global ecological fallout. But no country has as many rare earths processing plants, and their attendant environmental problems, as China. Last year, China's State Council

A half-century of rare earths mining in China has caused serious environmental problems.

reported that the country's rare earths operations are causing "increasingly significant" environmental problems. A half century of rare earths mining and processing has "severely damaged surface vegetation, caused soil erosion, pollution, and acidification, and reduced or even eliminated food crop output," the council reported, adding that Chinese rare earths plants typically produce wastewater with a "high concentration" of radioactive residues.

Bayan-Obo, China's largest rare earths project, has been operating for more than four decades. According to the Germany-based Institute for Applied Ecology, the site now has an 11-square-kilometer waste pond — about three times the size of New York City's Central Park — with toxic sludge that contains elevated concentrations of thorium.

China's lax environmental standards have enabled it to produce rare earths at roughly a third the price of its international competitors, according to a 2010 report on the country's rare earths industry by the Washington-based Institute for the Analysis of Global Security. The report noted that

China "has never actually worked out pollutant discharge standards for the rare earth industry."

Like nuclear power plants, rare earths projects require strict independent auditing in order to prevent environmental damage, according to Peter Karamoskos, a nuclear radiologist and the public's representative at Australia's Radiation Protection and Nuclear Safety Agency. But as the rare earths industry expands to developing countries like Malaysia and Vietnam, such oversight will be unlikely. "A regulator will either be in the pocket of the industry or a government," he says.

According to Gavin Mudd, an environmental engineer at Australia's Monash University, rare earths mining provides a wide range of economic and social benefits and can be exploited in a responsible way. However, he says no company — including Mitsubishi and Lynas — has managed to set a good example.

Mudd says Lynas decided to process its rare earths in Malaysia rather than Australia, where they are mined, because it received tax incentives. But he says that Lynas hasn't meaningfully engaged Malaysian communities to hear their concerns. A key problem with the company's proposals, he adds, is that it never took a baseline sample of the environment before it began operations, making it difficult to gauge the future environmental impacts. "Their approach to solid waste management has been very haphazard," says Mudd, who has offered unpaid advice to both the company and the activists who oppose its plans.

Lynas executives, including Executive Chairman Nicholas Curtis, say the plant will operate under high environmental standards and will dilute the thorium-tainted waste by mixing it with lime until it is below accepted international concentrations for the radioactive material. The lime mixture will be turned into solid structures that could be used for sea walls or construction materials, Lynas has said, although it remains unclear where those structures would be exported, and whether the process would use all of the plant's toxic waste. Curtis has said that there is no comparison between his facility and the old Mitsubishi one, which "never should have been built."

A recently released study of the plant by the Institute for Applied Ecology sketches a less sanguine portrait of the potential environmental impacts.

The Malaysian plant sits atop reclaimed wetland that is prone to flooding and lies only two miles from the sea.

The study faults a Lynas plan to dispose of wastewater through an open channel rather than a closed pipeline; a refusal by the company to disclose what the plant's exact chemical byproducts will be; and a temporary waste storage facility that the institute predicts will cause radioactive leakage "even under normal operating conditions." A Lynas spokesperson from the company's Australia headquarters did not respond to a request for comment.

Over the next two decades, the plant is expected to produce about 1.2 million metric tons of "residue," according to 2011 report prepared by Lynas for Malaysia's nuclear regulatory agency. It said the plant's waste will fall within radioactivity limits set by the International Atomic Energy Agency, and may be safely disposed of in "landfill type facilities with limited regulatory control."

The waste, however, will emit low levels of carcinogenic radioactivity for centuries, according to scientists. The International Atomic Energy Association recommended in 2011 that Malaysia's nuclear regulatory agency grant Lynas an operating license only after it submits a permanent decommissioning plan. Unlike Australia, Malaysia is not a party to the IAEA's legally binding 2001 convention governing appropriate and safe disposal of radioactive waste.

For most of last year, Lynas was locked in court battles against retired schoolteacher Tan Bun Teet and his grassroots coalition "Save Malaysia, Stop Lynas!," which challenged the government's January decision to grant the company a temporary operating license. This fall, Lynas finally won its temporary operating license after clearing legal appeals, and Tan says the first truckload of rare earths from the company's Australia mine rolled into its new Malaysia refinery on November 30 under police escort. But four Malaysian cabinet ministers warned in December that the company must export the radioactive waste from its new plant or risk losing its license.

Tan Bun Teet and his fellow activists, whose street protests in the Malaysian capital have faced tear gas and water cannons, are keeping up their legal fight by filing new appeals. Tan is especially concerned that the 247-acre Lynas plant sits atop reclaimed wetland that is prone to flooding and lies only about two miles from the South China Sea. The area receives about 10 feet of rainfall per year, and recent monsoon rains left the area drenched.

"We are worried," he says. "We don't want our environment to be destroyed as it was in China."

"Boom in Mining Rare Earths Poses Mounting Toxic Risks", 28/01/2013, online at: http://e360.yale.edu/feature/boom_in_mining_rare_earths_poses_mounting_toxic_risks/2614/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=88bdef8a94-RSS_EMAIL_CAMPAIGN&utm_medium=email

BACK TO TOP

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❖ Pakistan, UN seek to cut risk of glacial lake floods

DRONGAGH, Pakistan (AlertNet) - Abdul Jabbar was in his house in the Bindu Gol valley of Pakistan's northern Chitral district when a glacial lake burst through the ridge holding it back high above.

"We felt the ground shaking and heard the roar of the water, and we ran out of our homes," he said. The 2010 flood destroyed a few dwellings in his village of Drongagh, as well as many orchards, cultivated fields and water channels. "One person died in Shogram village when she chased after her livestock and was swept away by the water," Jabbar recalled.

The boulders and rocks deposited by the massive flood also blocked the Chitral River at the base of the valley for 12 hours. When the river finally broke through, it swept away bridges and damaged settlements downstream.

As temperatures in Pakistan's mountain regions rise and glacial lake outbursts become more common, people in Chitral - where every valley has at least one glacier - are becoming more anxious. "We need to study this glacier," said Jabbar. "We believe the melting ice underneath the glacier might burst through again."

The U.N. Development Programme (UNDP) and Pakistan's Ministry of Climate Change have chosen Bindu Gol valley as one of two sites for a new project to reduce the risks of glacial lake flooding in northern Pakistan. This $7.6 million project is one of the first initiatives to be funded by the U.N.-backed **Adaptation Fund**, which finances programmes that help developing countries adapt to the negative effects of climate change.

The other project site is the picturesque valley of Bagrote in the northern mountain region of Gilgit-Baltistan, which is home to half a dozen glaciers. In Bagrote, glaciers and humans exist in close proximity, but the warming climate is bringing more dangerous conditions for the valley's inhabitants.

Glacial Lake Outburst Floods (GLOFs) are happening regularly, caused by glaciers melting in the summer months. Floods occur when the natural dams - formed of ice or glacial sediment - containing the lakes are breached. They can occur quite suddenly, carry a lot of debris and cause considerable damage.

HIGH EXPECTATIONS

"Glacial flood events are more frequent now in Bagrote, destroying houses, livestock, graveyards and orchards. The community's expectations from this project are high," explained Shahid Ali, the head of a community-based organisation in the valley.

The literacy rate in Bagrote is much higher than in the rest of Pakistan, with many young college graduates. The community has adopted a cooperative approach to tackling its problems.

"We live in the shadow of at least five glaciers in Bagrote. There are around 1,200 households here, and we need an early warning system to protect our lives and our livestock," said Ali. Walls are also required to protect homes and fields from floods, as are alternative energy sources so that people no longer cut down forests near the glaciers, which could cause accelerated melting, he added.

The goal of the GLOF project - which began last year and is due to be completed in 2015 - is to develop the ability of public institutions and vulnerable communities to understand and address the risks of glacial lake floods.

It plans to work with local people to draw up disaster management plans and install early warning systems. But not everyone is satisfied with the initial design of the project.

Ijaz Ahmed, a community forest officer in Chitral, said it seems too focused on soft methods like research, adding that the area is already one of the best-researched parts of Pakistan. "I don't see how the local community will benefit without engineering structures and provision for slope stabilisation," he said.

Officials from the Ministry of Climate Change and the UNDP say it is too early to start finding fault with the project, as it only started last summer.

"We will raise awareness about GLOFs and conduct training for capacity-building and install an early warning system," said the project's national manager Khaleel Ahmed. "If structures like check dams and gabion walls lead to risk reduction then we can build them."

TIME PRESSURE

Designed by the UNDP and based on an earlier regional project to tackle glacial floods, the north Pakistan project was among the first four proposals to get the green light from the Adaptation Fund in late 2010. The hope is that it can serve as a model for other GLOF projects in the mountains of South Asia.

Glacial outburst flooding threatens communities across the Hindu Kush-Himalayan-Karakoram mountain ranges. Back in 2005, the International Centre for Integrated Mountain Development (ICIMOD) compiled an inventory of Pakistan's 5,000 glaciers across an area covering 15,000 square km. It found that 52 glacial lakes were in a potentially dangerous condition.

Due to government restructuring and funding delays, the Pakistan GLOF project now has just three years to complete its activities. As roads to the two sites are cut off in winter by heavy snowfall, work will be further limited to the summer and autumn months.

Last August, a central office was set up in Islamabad, as well as two field offices in Gilgit and Chitral towns on the premises of the Pakistan Meteorology Department (PMD), which will carry out research for the project.

In July the PMD set up one weather station in Chitral, the first of its kind in the area, and two weather stations in Bagrote valley, manned by trained volunteers from nearby villages. It has also submitted a request for three automatic stations.

The next step is to assess the glacial lakes, hidden beneath the glaciers in both valleys, by taking a team of geologists and hydrologists to the two field sites.

"In time, with the data we collect, we can even advise local people on how to improve their crops and agricultural practices," explained Manzoor Ahmed from the PMD in Chitral. This will require a minimum of 10 years of data analysis, he added.

LOCAL PARTICIPATION

Despite the potential benefits of the project for local residents, some feel that its objectives have not been communicated clearly enough.

"They keep saying it's a scientific project, but they have not explained what they want to do on the ground for us," commented one villager at a community meeting in Bagrote.

Managers acknowledge that more information needs to be provided at the local level, but emphasise that efforts are being made to let people know what is happening and invite them to participate.

Mujtaba Hussain, deputy secretary in the Ministry of Climate Change, said an initial workshop had been held in Gilgit where all the main groups affected by the project were invited to contribute their views. And according to UNDP officials, three calls for proposals have been advertised in national newspapers.

"The awareness level of the people will increase. This is different from other projects in the area, which focus on saving forests and conservation work or building water channels – this project focuses on capacity building and knowledge sharing," said project manager Ahmed. The lessons learned will be applied elsewhere, he added.

Experiences in Nepal underline the importance of taking local people into account. Here, two internationally funded GLOF projects failed in Rolwaling and Dudhhophi valleys due to a lack of community ownership.

After the projects were completed, there was no one local who could run or maintain the expensive early warning systems installed, which relied on sophisticated sirens and high-tech cameras, according to ICIMOD.

In northern Pakistan, where communities are highly educated and well-organised, the success of the project will depend on whether they participate in its various activities, from monitoring glaciers and building early warning systems, to putting together disaster management plans for their valleys.

"Pakistan, UN seek to cut risk of glacial lake floods", 28/01/2013, online at: http://www.trust.org/alertnet/news/pakistan-un-seek-to-cut-risk-of-glacial-lake-floods/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=88bdef8a94-RSS_EMAIL_CAMPAIGN&utm_medium=email

BACK TO TOP

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❖ Laos may need incentive to stop building Mekong dam

David Fullbrook says when words fail, incentives might persuade Laos to abandon its dam plan

Doing business in agriculture or fisheries in the Mekong Delta is not looking like such a good long-term bet these days. For now, the Mekong's waters, rich in nutrients, rise and fall as they have for thousands of years, and the yield is good. Those days, however, are coming to an end.

Laos is building the Xayaburi hydroelectric dam to block the Mekong, despite promising its neighbours that share the river it would not. The dam will irreversibly change the nature of the river already under stress from several dams upstream in Yunnan. Cambodia and Vietnam, which lie downstream, pleaded for delay, to no avail, at a recent meeting of the Mekong River Commission, a think tank in all but name.

After the communist victories of 1975, comrades on both sides had at first ensured that Laos toed the line set by Hanoi. But that line has withered for two reasons. One, platitudes and aid have poured in from Beijing over the past decade, accompanied by investment from public and private Chinese firms. Two, the legacy of wartime suffering that maintained Vietnamese influence has faded along with the departure of old soldiers.

Their place in Vientiane has been taken by hard-headed leaders who see the personal and national interest in turning land into capital.

Since the 1960s, some experts have argued the best bet for Laos is to dam the Mekong and export electricity to China, Thailand and Vietnam. Vietnamese firms, too, have built dams on Mekong tributaries in Laos and Vietnam.

Therein lies the rub. Hanoi wants the natural and electrical power of the Mekong. But one precludes the other. A river without dams delivers high environmental quality, providing high yields of rice, fruit and fish from the Mekong Delta, guaranteeing national food security and billions in export dollars. A river with dams also promises to deliver benefits, but may not do so because of climate change and corruption.

Vietnam, maximising gas, carbon capture, energy efficiency, and wind and solar, might do without hydroelectricity. There isn't, however, any substitute for the security of strong ecosystems and farmers and fishers who know what they are doing. The key to that security is a Mekong that works according to the design of nature.

If the benefits of food and national security are valued, then they are going to have to be paid for. If the beneficiaries won't pay for Laotians to behave in one way, then those who covet electricity will pay for them to behave in another that could lead to more dams like the Xayaburi.

It may not be pretty but then realpolitik never is. Governments and investors banking on abundant food from Indochina are on notice to make plans for a Mekong future very different from the past.

"Laos may need incentive to stop building Mekong dam", 28/01/2013, online at: http://www.scmp.com/comment/insight-opinion/article/1137290/laos-may-need-incentive-stop-building-mekong-dam

BACK TO TOP

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❖ Dialogue Needed On Mekong Dam Project

Laos's neighbors and the international community are again voicing concerns about hydroelectric project.

Laos's neighbors and the international community are again voicing concerns about the construction of a multibillion dollar hydroelectric project they fear could disrupt the lives of millions of people living along the Mekong River in Southeast Asia.

Vietnam and Cambodia, both downstream from the proposed dam near Xayaburi in north central Laos, complain that the Laotian government has failed to consult them sufficiently on the project and the dam's environmental and social impacts are as yet unknown.

The dam, one in a series of hydroelectric projects planned for the Mekong, will be jointly owned by Laos and a Thailand-based construction company that will build and then operate it. Ninety-five percent of the electricity to be generated will be sent to Thailand. In December 2011, members of the Mekong River Commission agreed to assess the environmental impacts of construction throughout the region, but last November Laos signaled the start of dam construction with a formal groundbreaking at the site.

Laos, Thailand, Vietnam and Cambodia share the lower stretches of the 4,000-kilometer Mekong, which provides livelihoods and food for tens of millions of people in the river basin. A change in the river's flows could jeopardize this ecosystem, the dam's critics say.

The United States recognizes the important role that dams can play in managing water resources to advance economic growth. At the same time, though, our own experience within the U.S. has made us acutely aware of the economic, social and environmental impacts that large infrastructure projects can have over the long-term.

It is not for the United States to decide what dams should or should not be built. It is clear, however, that building dams on the mainstream of the Mekong may have profound and irrevocable impacts on the river and on the lives of millions of people who depend upon it. These decisions must be taken deliberatively with the full engagement of all the affected stakeholders.

The United States urges all parties to pause on any consideration of future hydropower dam projects on the Mekong until a sound assessment of their impact on communities, environment and challenges to food security are addressed.

We strongly encourage nations in the region to continue to work through the Mekong River

Commission to ensure that the best science can help inform these decisions. If the process is sound, we believe the Mekong basin countries will make the right decision for the benefit of the region's people.

"Dialogue Needed On Mekong Dam Project", 31/01/2013, online at: http://editorials.voa.gov/content/dialogue-needed-on-mekong-dam-project/1594814.html

BACK TO TOP

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❖ Failed Afghan dam project 'offered British military redemption' after Iraq debacle'

The British military took on one of the biggest operations of the war in Afghanistan to redeem itself after failures in Iraq, transporting a huge dam turbine through hostile territory in a largely symbolic act, according to a new report.

British officers and American aid officials ignored warnings that the mission to Kajaki dam, in Helmand province, was flawed and that power lines from the hydroelectric plant had yet to be repaired.

The fate of the giant turbine – still in packing crates at the dam almost five years after 200 insurgents were killed during the operation to deliver it – has become a metaphor for the Afghan war, cited repeatedly as an example of how attempts to rebuild the country have failed.

Research by Noah Arjomand of the Afghan Analysts Network, based on interviews with British and American officials, found that Operation Eagle's Nest was conducted for the benefit of the British military and USAID, the organisations that championed the project.

"Over time, Turbine Two became a way for both the American aid agency and the British military to show their mettle to a dominant US Department of Defense," the report concluded.

"The turbine thus took on significance beyond the actual 1.5 megawatts of electricity that it was to provide, especially bearing in mind that this would, in fact, put only a small dent in the ever-increasing demand for electricity from southern Afghanistan's cities."

For the British military, the operation offered "redemption" after being forced out of Basra in 2007, concludes the report.

The five-day operation was the biggest of its kind since the Second World War, consuming enormous military resources at a time when British forces were already spread thin.

A convoy of 100 vehicles moved seven 20 to 30-ton turbine sections from Kandahar airfield to the dam.

Aid officials hoped the turbine would produce power for thousands of families, winning them over to the government in Kabul.

The turbine was never installed. Chinese contractors pulled out, citing lack of security, and forces were unable to secure the road to Kajaki for delivery of cement and gravel.

American officials now hope work can finally begin this year, after security on the road through Sangin to the dam has improved.

A spokesman for the Ministry of Defence said: "The decision for UK troops to transport the turbine was made by ISAF and was based on military guidance. In 2008 British troops were operating in the Kajaki area and had access to the capabilities required to transport the turbines, therefore it made military sense for UK forces to lead the mission."

"Failed Afghan dam project 'offered British military redemption' after Iraq debacle"", 30/01/2013, online at: http://www.telegraph.co.uk/news/worldnews/asia/afghanistan/9836873/Failed-Afghan-dam-project-offered-British-military-redemption-after-Iraq-debacle.html

BACK TO TOP

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❖ 'Energy for water' may have greater impact on the nexus

In our series on the water-food-energy nexus, Tim Smedley looks at the amount of energy we use to pump, clean and transport water

In the water-food-energy nexus, the relationship between water and energy may appear obvious. Water is used to create energy through hydro-power for example, or to cool power stations or to mine fossil fuels. But there's another side to this 'water for energy' equation, which arguably has a greater impact on the nexus: the energy needed to pump, clean and transport water or 'energy for water'.

The US alone uses 520bn kilowatt-hours (kWh) to move, treat and heat its water, which accounts for up to 60% of the energy bill in some cities, and 90% of the energy bill on some farms. This equates to 13% of the entire electricity use in the US, and more than 290m metric tons of carbon dioxide (equal to the annual emissions of 53m cars) each year.

"In many areas there is no other way than to pump water from the source to the end user, because the end user lives at a higher altitude than the source," explains Gérard Payen, president of AquaFed, the International Federation of Private Water operators. "This is the case when you pump water from an underground aquifer.

He adds: "The world is now more than half urbanised, people live in cities, and for them to have water at home they need water to be pressurised in order to go up to the top floors."

In order for that water to be drinkable, it also needs to be treated. Wastewater treatment amounts to approximately 3% of all electricity used in the US.

"Every year there is more energy used for water than the year before," says Payen. "It is a big concern ... the work that is included in [moving] a cubic metre of freshwater is increasing because of increased pollution, [and] because of urbanisation requiring fetching water from farther and farther away."

Much of that is also done needlessly: in England and Wales in 2010-11, 2,559 megalitres of water (the equivalent of 1m litres) were lost per day through leaky pipes.

In regions of water scarcity, all this is evidently unsustainable. The US leads the way in energy-for-water research, primarily because it is home to several such regions. A report by the Atlantic Council found that California uses 20% of its electricity, 30% of its natural gas and 88bn gallons of

diesel fuel a year for the sourcing, moving, treating and heating of its water. In south-central states, it predicted that annual per capita electricity consumption will increase from 400 to 700 kWh per year, and in west-central states, from almost 500 to more than 700 kWh, as "increasing water and energy demands butt up against declining aquifers."

There are some innovations that are reducing this energy need. "The most interesting example is the way water is treated in water treatment plants and waste water treatment plants (WWTP)," says Payen. "These are industrial facilities where the quality of the water is changed through several processes ... Today most of those plants try to use biological, natural processes. When you use biology, you don't need as much energy. That is becoming standard now."

A WWTP serving about 600,000 people in the San Francisco Bay area of California has achieved energy savings of around 70% per year.

Other innovations include desalination, the process of making freshwater out of sea or salt water. "Two decades ago, desalination was made from boiling water," explains Payen. "You had to heat the water up to boiling point, then you would capture the vapour in order to have clean water. It required a lot of energy. Now another technology has been introduced –reverse osmosis filtration – where the energy consumption to make a cubic metre of water has been reduced continuously."

At policy level, one controversial suggestion is to increase the market price of water. "The American public believes that access to cheap (or free) clean water is a right," says the Atlantic Council. "Like electricity, the reality is that while water is no longer free, neither will it remain cheap; the price of water will rise for all users. Pricing policies may be one tool for reducing water use."

When something has no value, it is often treated as such. "The pricing is important, but particularly of energy," argues professor Declan Conway of the UEA Water Security Research Centre. "We know for example in irrigated agriculture, where farmers have access to cheap energy, either electricity or subsidised fuel for pumping, they tend not to use the water very efficiently – there are no real savings for them to do so. If the price of the energy is much higher, then they tend to use the water more efficiently."

When asked if the water itself should cost more, he says that it may be a likely outcome, "but there are all sorts of other factors that need to be considered in terms of equity and ... the social effects."

The water scarcity that blights parts of the developing world requires an international response. Payen is a member of the UN Secretary General's Advisory Board on Water and Sanitation. "On the UN board, the interactions between water and energy is something that is more and more discussed positively," he says. "There is a big global event called the World Water Forum, a multi-stakeholder event with 10,000 people from NGOs, businesses, science institutes, governments ... at a diplomatic level between governments the interaction between water, energy and food is more and more discussed."

It sounds like a lot of talk and no action. But Payen firmly disagrees. "I know what action means ... but in the global arena, talks are important to stimulate action.

He adds: "There are national policies on access to drinking water that have been stimulated by the UN talks, and those policies are driving action in the field in countries. So the fact that the water-food-energy nexus has started to be discussed at the UN level means that more national policies are influenced by those talks." Let's hope he's right.

"'Energy for water' may have greater impact on the nexus", 01/02/2013, online at: http://www.guardian.co.uk/sustainable-business/energy-water-greater-impact-nexus?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=dd2ddef81f-RSS_EMAIL_CAMPAIGN&utm_medium=email

BACK TO TOP

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❖ Indonesian gov't outlines ways to improve water supply infrastructure, irrigation

AKARTA, Feb. 1 (Xinhua) -- An Indonesian minister said that government has set plans to improve water supply for the public and repair national irrigation system so as to increase rice production, local media reported on Friday.

National Development Planning (Bappenas) Minister Armida Alisjahbana said that the implementation of the plans require intense coordination between central and regional governments.

"The target of clean water pipe network was set at 68 percent by 2015, and now it has entered 55 percent at the average," she was quoted by the Antara news agency as saying. The 2015 water supply target was part of Indonesia's efforts to comply with Millennium Development Goals (MDGs).

Some 65.27 trillion rupiah (about 6.4 billion U.S. dollars) is required to finance the projects, she said, adding that 12 trillion of the funds would be provided by the government while the remaining lion part of 52.27 trillion rupiah was expected to be contributed by investors.

More than 100 million people in Indonesia lack access to drinking water, according to the data issued by the ministry.

The minister said the inadequate water supply problem was incited by insufficient operation of the state-run firm following financial restructuring process in the firm.

Public Works Minister Djoko Kirmanto said that government would improve the performance of the National Water Resources Council in a bid to support the nation's food resilience program.

Indonesia has targeted rice production surplus at 10 million by 2014, rehabilitate 2.5 million hectares of arid land and hydroelectric renewable energy.

"Indonesian gov't outlines ways to improve water supply infrastructure, irrigation", 01/02/2013, online at: http://news.xinhuanet.com/english/world/2013-02/01/c_132144157.htm?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=dd2ddef81f-RSS_EMAIL_CAMPAIGN&utm_medium=email

BACK TO TOP

❖ Why Dismissing Water Supply through Water Vendors Is a Bad Idea

Water supply and sanitation services are important for a whole host of reasons – time saving, dignity, convenience, economic growth, – including of course, public health. Yet it remains difficult to evaluate the extent to which those services actually do change health outcomes. Public health is affected by many variables, which interact in complex ways. In addition, the quality of water people consume and their exposure to fecal pathogens are affected by a complex set of factors based on individual and household practices, as well as the service standards of water and sanitation providers.

One recent study illustrates how much the quality of service matters. A team of researchers from the University of Göttingen (Germany) has used rigorous statistical techniques to evaluate a large-scale project in urban Yemen that provides household connections to piped water and sewerage in eight provincial towns throughout the country, including Amran in the mountains and Zabid in the coastal Tihama region, which were selected for the analysis together with nearby comparison towns.

The result is completely counterintuitive. The study finds that when households in the focus cities were connected to the piped water network, the likelihood of their getting diarrhea and the severity of each bout of diarrhea worsened. When they also had a household connection to sanitation, both worsened further. The effect was particularly strong among children under 5 years of age. Why would this be? The water released by the water treatment plant is clean. However, the water delivered to household is not. It's getting contaminated in the pipes between the treatment and the household. Because the pipes are empty for more than half of the time they corrode fast and contaminants are introduced. The study finds that more than half of the worsening of health outcomes can be attributed to the piped water network.

Although Yemen is one of the most water stressed countries in the world, intermittent water supply is common in many parts of the developing world and especially in the Middle East, with largely unknown consequences on water quality and health outcomes. This research is therefore potentially relevant to many towns in the region.

What does this mean for development policy?

First, we need to worry not only about access to water and sanitation services, but also about quality of service. Second, we need to understand more explicitly the costs of poor service in terms of public health, household coping strategies (e.g. bottled water, storage tanks, etc.) and in terms of additional wear and tear on the network infrastructure. Third, where intermittent supply is likely to be a reality in the short to medium term, we need to think about interim solutions. These might include water purification at the household level, and could also mean alternative supplies, such as water trucks and other water vendors.

Truck water is currently not considered an improved drinking water source in the UN's Joint Monitoring Program. It would be useful to conduct some rigorous studies to identify the extent to which truck water can provide a safe source of drinking water as an interim solution. If we can ensure the safety of supplies from trucks, they hold potential given that they do not require network infrastructure investment, are low cost, are flexible to changing ground water levels, and water vendors already exist throughout the MENA region.

"Why Dismissing Water Supply through Water Vendors Is a Bad Idea", 28/01/2012, online at: http://blogs.worldbank.org/water/why-dismissing-water-supply-through-water-vendors-is-a-bad-idea

BACK TO TOP

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❖ Could Water Be the Next Big Asset Class?

The U.S. has recently experienced the worst drought in decades, yet each year an estimated 1.7 trillion gallons of water leaks from pipes before it can be put to use. And according to the United Nations, currently 41% of the world's population lives in a water stressed area.

Despite the dramatic need for investment in water infrastructure, there is no way to price the cost of producing water, according to IBM and Waterfund, a global water risk management firm. So no benchmark exists with which to assess risk when it comes to investing in the water sector. Until now.

IBM (IBM) is partnerering with Waterfund to create the first-ever water cost index. By using Big Data analytics, it will estimate the cost of producing water globally for 25% of the world's GDP, and allow the creation of financial products to invest in the water sector.

The principals involved sat down with the Daily Ticker to explain.

"At one end of the spectrum you have housing, the most over-financialized sector of our economy," Scott Rickards, President and CEO of Waterfund. "At the other end, you have water - there's not a single financial product. Investors, Wall Street have pretty much ignored water. What we're doing is using derivatives and insurance products to link to the index and enable risk management to actually take place for the first time in the water industry."

"There's plenty of capital that's beginning to take an interest in investing in water," notes Peter Williams, IBM Distinguished Engineer and Big Green Innovations CTO. "What we think the index will do is make it easier to invest in water by establishing a risk benchmark against which people can then lend. And the idea then is to encourage capital inflows into the water sector."

This means for governments, municipalities, and water agencies looking for ways to finance the estimated $1 trillion in investment needed in water infrastructure in the U.S. alone, they could more easily raise this money and keep the liquidity (i.e. water) flowing to citizens.

On the note of risk, the misadventures of mortgage-backed securities during the housing crisis (not tomention commodity bubbles) may raise eyebrows when it comes to the idea of speculation over an element so essential to life.

Rickards argues, "It's taken 25 years for housing to go from non-financialized to where we are today after everything that occurred four years ago." When it comes to water, "if it ever gets there where speculation is a problem, that will not be a bad thing because we will have come a long way in the meantime."

In the meantime, when it comes to retail investors being able wager a bet on water, Rickards and Williams anticipate an ETF allowing people to "go long the cost of water."

"Could Water Be the Next Big Asset Class?", 30/01/2013, online at: http://finance.yahoo.com/blogs/daily-ticker/could-water-next-big-asset-class-144114830.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=af89251437-RSS_EMAIL_CAMPAIGN&utm_medium=email

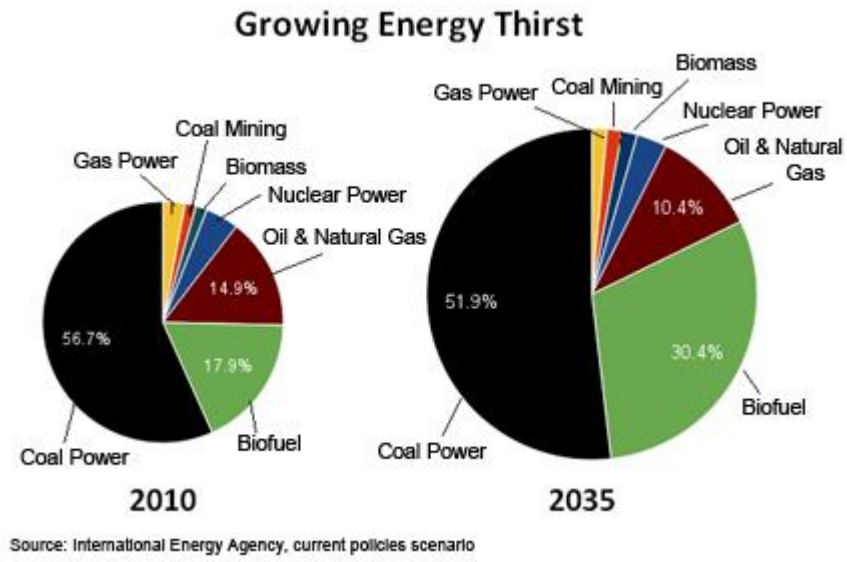
BACK TO TOP

❖ Water Demand for Energy to Double by 2035

The amount of fresh water consumed for world energy production is on track to double within the next 25 years, the International Energy Agency (IEA) projects.

And even though fracking—high-pressure hydraulic fracturing of underground rock formations for natural gas and oil—might grab headlines, IEA sees its future impact as relatively small.

By far the largest strain on future water resources from the energy system, according to IEA's forecast, would be due to two lesser noted, but profound trends in the energy world: soaring coal-fired electricity, and the ramping up of biofuel production.



National Geographic

If today's policies remain in place, the IEA calculates that water consumed for energy production would increase from 66 billion cubic meters (bcm) today to 135 bcm annually by 2035.

That's an amount equal to the residential water use of every person in the United States over three years, or 90 days' discharge of the Mississippi River. It would be four times the volume of the largest U.S. reservoir, Hoover Dam's Lake Mead.

More than half of that drain would be from coal-fired power plants and 30 percent attributable to biofuel production, in IEA's view. The agency estimates oil and natural gas production together

would account for 10 percent of global energy-related water demand in 2035. (See related quiz: "What You Don't Know About Biofuel.")

Not everyone agrees with the IEA's projections. The biofuel industry argues that the Paris-based agency is both overestimating current water use in the ethanol industry, and ignoring the improvements that it is making to reduce water use. But government agencies and academic researchers in recent years also have compiled data that point to increasingly water-intensive energy production. Such a trend is alarming, given the United Nations' projection that by 2025, 1.8 billion people will be living in regions with severe water scarcity, and that two-thirds of the world's population could be living under water-stressed conditions.

"Energy and water are tightly entwined," says Sandra Postel, director of theGlobal Water Policy Project, and National Geographic's Freshwater Fellow. "It takes a great deal of energy to supply water, and a great deal of water to supply energy. With water stress spreading and intensifying around the globe, it's critical that policymakers not promote water-intensive energy options."

Power Drunk

The IEA, established after the oil shocks of the 1970s as a policy adviser on energy security, included a warning on water in a special report within its latest World Energy Outlook released late last year. "A more water-constrained future, as population and the global economy grow and climate change looms, will impact energy sector reliability and costs," the agency said.

National Geographic News obtained from IEA a detailed breakdown of the figures, focusing on the agency's "current policies" scenario—the direction in which the world is heading based on current laws, regulations, and technology trends.

In the energy realm, IEA sees coal-powered electricity driving the greatest demand for water now and in the future. Coal power is increasing in every region of the world except the United States, and may surpass oil as the world's main source of energy by 2017. (See related interactive map: The Global Electricity Mix.)

Steam-driven coal plants always have required large amounts of water, but the industry move to more advanced technologies actually results in greater water consumption, IEA notes. These advanced plants have some environmental advantages: They discharge much less heated water into rivers and

other bodies of water, so aquatic ecosystems are protected. But they lose much more water to evaporation in the cooling process.

The same water consumption issues are at play in nuclear plants, which similarly generate steam to drive electric turbines. But there are far fewer nuclear power plants; nuclear energy generates just 13 percent of global electricity demand today, and if current trends hold, its share will fall to about 10 percent by 2035. Coal, on the other hand, is the "backbone fuel for electricity generation," IEA says, fueling 41 percent of power in a world where electricity demand is on track to grow 90 percent by 2035. Nuclear plants account for just 5 percent of world water consumption for energy today, a share that is on track to fall to 3 percent, IEA forecasts. (See related quiz: "What You Don't Know About Water and Energy.")

If today's trends hold steady on the number of coal plants coming on line and the cooling technologies being employed, water consumption for coal electricity would jump 84 percent, from 38 to 70 billion cubic meters annually by 2035, IEA says. Coal plants then would be responsible for more than half of all water consumed in energy production.

Coal power producers could cut water consumption through use of "dry cooling" systems, which have minimal water requirements, according to IEA. But the agency notes that such plants cost three or four times more than wet cooling plants. Also, dry cooling plants generate electricity less efficiently.

The surest way to reduce the water required for electricity generation, IEA's figures indicate, would be to move to alternative fuels. Renewable energy provides the greatest opportunity: Wind and solar photovoltaic power have such minimal water needs they account for less than one percent of water consumption for energy now and in the future, by IEA's calculations. Natural gas power plants also use less water than coal plants. While providing 23 percent of today's electricity, gas plants account for just 2 percent of today's energy water consumption, shares that essentially would hold steady through 2035 under current policies.

The IEA report includes a sobering analysis of the water impact of carbon capture and sequestration (CCS) technology. If the world turns to CCS as a way to cut greenhouse gas emissions from coal plants, IEA's analysis echoes that of outside researchers who have warned that water consumption will be just as great or worse than in the coal plants of today. "A low-carbon solution is not

necessarily a low-water solution," says Kristen Averyt, associate director for science at the Cooperative Institute for Research in Environmental Sciences at the University of Colorado. However, based on current government policies, IEA forecasts that CCS would account for only 1.3 percent of the world's coal-fired generation in 2035. (See related story: "Amid Economic Concerns, Carbon Capture Faces a Hazy Future.")

Biofuel Thirst

After coal power, biofuels are on track to cause the largest share of water stress in the energy systems of the future, in IEA's view. The agency anticipates a 242 percent increase in water consumption for biofuel production by 2035, from 12 billion cubic meters to 41 bcm annually.

The potential drain on water resources is especially striking when considered in the context of how much energy IEA expects biofuels will deliver—an amount that is relatively modest, in part because ethanol generally produces less energy per gallon than petroleum-based fuels. Biofuels like ethanol and biodiesel now account for more than half the water consumed in "primary energy production" (production of fuels, rather than production of electricity), while providing less than 3 percent of the energy that fuels cars, trucks, ships, and aircraft. IEA projects that under current government policies, biofuels' contribution will edge up to just 5 percent of the world's (greatly increased) transportation demand by 2035, but fuel processed from plant material will by then be drinking 72 percent of the water in primary energy production.

"Irrigation consumes a lot of water," says Averyt. Evaporation is the culprit, and there is great concern over losses in this area, even though the water in theory returns to Earth as precipitation. "Just because evaporation happens *here*, does not mean it will rain *here*," says Averyt. Because irrigation is needed most in arid areas, the watering of crops exacerbates the uneven spread of global water supply.

Experts worry that water demand for fuel will sap water needed for food crops as world population is increasing. "Biofuels, in particular, will siphon water away from food production," says Postel. "How will we then feed 9 billion people?" (See related quiz: "What You Don't Know About Food, Water, and Energy.")

But irrigation rates vary widely by region, and even in the same region, farming practices can vary significantly from one year to the next, depending on rainfall. That means there's a great deal of uncertainty in any estimates of biofuel water-intensity, including IEA's.

For example, for corn ethanol (favored product of the world's number one biofuel producer, the United States), IEA estimates of water consumption can range from four gallons to 560 gallons of water for every gallon of corn ethanol produced. At the low end, that's about on par with some of the gasoline on the market, production of which consumes from one-quarter gallon to four gallons water per gallon of fuel. But at the high end, biofuels are significantly thirstier than the petroleum products they'd be replacing. For sugar cane ethanol (Brazil's main biofuel), IEA's estimate spans an even greater range: from 1.1 gallon to 2,772 gallons of water per gallon of fuel.

It's not entirely clear how much biofuel falls at the higher end of the range. In the United States, only about 18 to 22 percent of U.S. corn production came from irrigated fields, according to the U.S. Department of Agriculture. And the remaining water in ethanol production in the United States—the amount consumed in the milling, distilling, and refining processes—has been cut in half over the past decade through recycling and other techniques, both industry sources and government researchers say. (One industry survey now puts the figure at 2.7 gallons water per gallon of ethanol.) A number of technologies are being tested to further cut water use.

"It absolutely has been a major area of focus and research and development for the industry over the past decade," says Geoff Cooper, head of research and analysis for the Renewable Fuels Association, the U.S.-based industry trade group. "Our member companies understand that water is one of those resources that we need to be very serious about conserving. Not only is it a matter of sustainability; it's a matter of cost and economics."

One potential solution is to shift from surface spraying to pumped irrigation, which requires much less water, says IEA. But the downside is those systems require much more electricity to operate.

Water use also could be cut with advanced biofuels made from non-food, hardy plant material that doesn't require irrigation, but so-called cellulosic ethanol will not become commercially viable under current government policies, in IEA's view, until 2025. (If governments enacted policies to sharply curb growth of greenhouse gas emissions, IEA's scenarios show cellulosic ethanol could take off as soon as 2015.)

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Fracking's Surge

Fracking and other unconventional techniques for producing oil and natural gas also will shape the future of energy, though in IEA's view, their impact on water consumption will be less than that of biofuels and coal power. Water consumption for natural gas production would increase 86 percent to 2.85 billion cubic meters by 2035, when the world will produce 61 percent more natural gas than it does today, IEA projects. Similarly, water consumption for oil production would slightly outpace oil production itself, growing 36 percent in a world producing 25 percent more oil than today, under IEA's current policies scenario.

Those global projections may seem modest in light of the local water impact of fracking projects. Natural gas industry sources in the shale gas hot spot of Pennsylvania, for instance, say that about 4 million gallons (15 million liters) of water are required for each fracked well, far more than the 100,000 gallons (378,540 liters) conventional Pennsylvania wells once required. (Related: "Forcing Gas Out of Rock With Water")

IEA stresses that its water calculations are based on the entire production process (from "source to carrier"); water demand at frack sites is just one part of a large picture. As with the biofuel industry, the oil and gas industry is working to cut its water footprint, IEA says. "Greater use of water recycling has helped the industry adapt to severe drought in Texas" in the Eagle Ford shale play, said Matthew Frank, IEA energy analyst, in an email.

"The volumes of water used in shale gas production receive a lot of attention (as they are indeed large), but often without comparison to other industrial users," Frank added. "Other sources of energy can require even greater volumes of water on a per-unit-energy basis, such as some biofuels. The water requirements for thermal power plants dwarf those of oil, gas, and coal production in our projections."

That said, IEA does see localized stresses to production of fossil fuels due to water scarcity and competition—in North Dakota, in Iraq, in the Canadian oil sands. "These vulnerabilities and impacts are manageable in most cases, but better technology will need to be deployed and energy and water policies better integrated," the IEA report says. (See related story: "Natural Gas Nation: EIA Sees U.S. Future Shaped by Fracking.")

Indeed, in Postel's view, the silver lining in the alarming data is that it provides further support for action to seek alternatives and to reduce energy use altogether. "There is still enormous untapped potential to improve energy efficiency, which would reduce water stress and climate disruption at the same time," she says. "The win-win of the water-energy nexus is that saving energy saves water."

"Water Demand for Energy to Double by 2035", Marianne Lavelle and Thomas K. Grose30/01/2013, online at: http://news.nationalgeographic.com/news/energy/2013/01/130130-water-demand-for-energy-to-double-by-2035/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=af89251437-RSS_EMAIL_CAMPAIGN&utm_medium=email

BACK TO TOP

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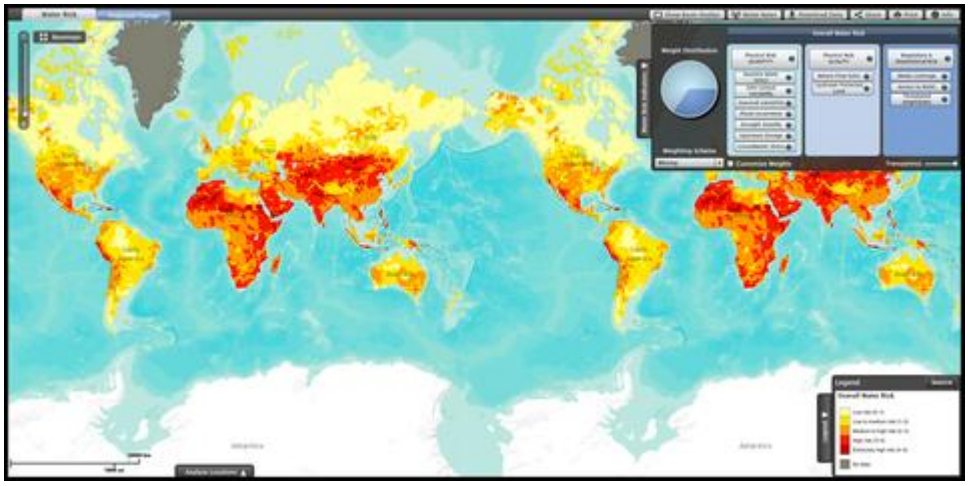
❖ A One-Stop Shop for Water Worries



The Aqueduct Water Risk Atlas harnesses the latest geo-tagged scientific data to map the state of freshwater supplies globally.

Water, or the lack thereof, is one of the defining challenges of the 21st century. As temperatures rise and droughts become more frequent, the threat of dwindling water resources worries not just environmentalists and governments but companies and their investors, too.

Nearly every industrial sector, from food and beverages to mining to pharmaceuticals, depends on water for its operations. Figuring out which places are likely to be hit hardest can help a company either steer clear of a certain region or plan ahead to minimize damage to its business or supply chain.

Now, a new interactive tool is at hand to help clarify those risks.

The Aqueduct Water Risk Atlas, just unveiled online by the nonprofit World Resources Institute's Aqueduct project, maps the state of freshwater globally. The interface allows companies, investors, governments or any other interested party to visualize and compare water conditions, from the continental scale to the local one.

"As important as water is, we give it very little attention," said Betsy Otto, the project's director. "We haven't invested as we should in pricing, tracking and locating water in ways that make most sense for human economies."

Ms. Otto's working assumption is that if companies have the means to take water risks into consideration, they will do so. Many companies have alreadymade that commitment, and some are partners on the Aqueduct project, including Goldman Sachs, General Electric, Bloomberg, Talisman Energy and Dow.

"For us, water is a strategic issue," said Kyung-Ah Park, head of the environmental markets group at Goldman Sachs. "We look at supply chain issues and disruptions which could have an implication on our client's bottom line."

The full version of the atlas, three years in the making, harnesses the latest geo-tagged scientific data to create 12 different indicators of water quality, including drought, flood and seasonal variability. The indicators visually overlay one another to create a composite view of aggregate water stress. The ecosystems layer, for example, highlights fragile habitats where freshwater fishes, amphibians and birds may live, while the groundwater supply layer — the first of its kind to be included in such an analysis — indicates places where aquifers might be drying up.

Not every user, however, defines risk in the same way, and the tool enables you to weight different indicators accordingly. Aqueduct also provides preset water scenarios tailored to 10 different sectors, including semiconductor manufacturing, textiles, and oil and gas. More advanced users can shape the maps to fit individual needs.

"Once a company develops a map to perfectly reflect its scenario, it can compare which places expose its operation to the highest risk," said Robert Kimball, an associate at the World Resources Institute. "We want the information to be out there in an easily usable, accessible way."

The institute acknowledges that the maps are not perfect. Information is far from complete on global groundwater conditions, for example, and very few real-time monitoring efforts are in place for freshwater. The organization plans to gradually incorporate new findings, however, including remote sensing data and monitoring results from NASA satellites.

In April, it plans to release maps predicting the water situation for 2020; projections for 2030 and 2040 will follow.

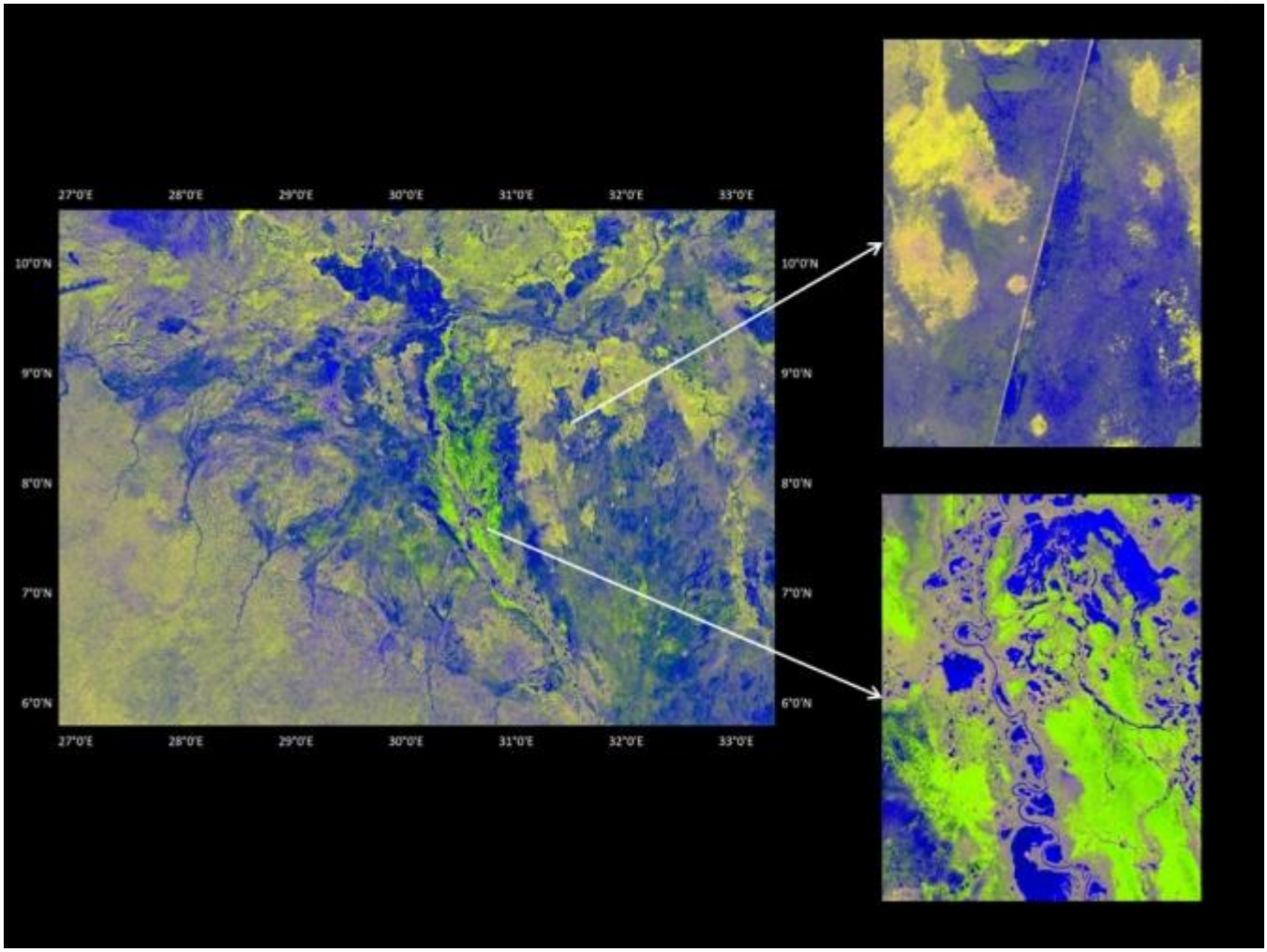
"A One-Stop Shop for Water Worries", 30/01/2013, online at: http://green.blogs.nytimes.com/2013/01/30/a-one-stop-shop-for-water-worries/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=af89251437-RSS_EMAIL_CAMPAIGN&utm_medium=email

BACK TO TOP

❖ Seeing the Sudd from Space

Special feature post for **World Wetlands Day**, February 2nd.

The first ever satellite map of the South Sudan wetland reveals its unique nature.



The Sudd wetland of South Sudan is one of the largest tropical wetlands in the world. However, despite covering an area twice the size of Spain in the wet season, very little is known about the number of people it supports or the current state of its biodiversity. "The wetland as a whole and its dynamics have not been mapped repetitively or systematically," explains Lisa-Maria Rebelo, a researcher in remote sensing at the**International Water Management Institute** (IWMI) and a member of the international science team set up to support the **Japan Aerospace Exploration Agency's (Jaxa) Kyoto and Carbon (K&C) Initiative**. In part this is due to the fact that satellite images relying in visual data cannot easily see beneath vegetation or clouds to get an accurate picture of where the water is.

Through the K&C initiative, however, Rebelo is working to create the most up-to-date map of the Sudd using radar remote sensing data supplied by **JAXA**. The long-wave band radar data acquired by the PALSAR instrument between 2006-2011 has the benefit of allowing scientists to see what's happening beneath the vegetation canopy. "We get a very distinct signal between open water, flooded vegetation and terrestrial land," says Rebelo. "This gives us a much clearer picture, compared to optical data, for looking at the dynamics of the different wetland components, and inundation patterns and dynamics."

A giant sponge

The Sudd, of which 57 million hectares was designated a Ramsar Wetland of International Importance in 2006, is located in the lower reaches of the White Nile (Bahr el Jebel), which flows north from Lake Victoria in Uganda. The wetland receives rainfall from the surrounding catchment and in-flows from Lake Victoria. It acts like a giant sponge, retaining water and releasing it slowly throughout the year. In this way, it regulates the flows of the White Nile. Early findings from Rebelo's analyses of the satellite data show the wetland has increased in size on an annual basis over the past ten years. This does not appear to be due to changes in rainfall patterns, so therefore must be related to changes in flow; however, more work is needed to find the exact reason.

Papyrus, aquatic grasses and water hyacinth, inhabited by crocodiles and hippopotamuses, grow in dense thickets in the shallow waters of the Sudd. Floating islands of vegetation up to 30km across make it hard to navigate a way through the swamps either by boat or overland; early explorers seeking the source of the Nile often took months to get across. Two civil wars, the first between 1955 and 1972 and the second from 1983 to 2005 have also contributed to the dearth of knowledge about the Sudd. The political instability culminated with South Sudan becoming an independent state in 2011, but gaining access to the wetland remains difficult.

Cultural roots

In April 2010, Rebelo and a team of IWMI researchers met in Juba, the main town at the southern end of the wetland. The aim was to find out what people thought of the wetland, the main threats to the wetland, and the priorities for future research. It became apparent during the workshop that the wetland was of great cultural importance to many South Sudanese. "Representatives present from the Government of South Sudan were all very passionate about the wetland," Rebelo recalls. "Many of the people we met had grown up in or around the wetland and many of their cultural ceremonies were tied to it."

An environmental hotspot

The few studies that have been conducted on the wetland reveal the Sudd to be a unique and highly biodiverse ecosystem, home to over 400 bird and 100 mammal species. The Sudd supports the highest population of shoebill storks and the greatest numbers of antelopes in Africa. Many fish species migrate from the surrounding rivers to the nutrient-rich floodplains to feed and breed during

the seasonal floods. While no recent figures are available, the Sudd is of great importance to local livelihoods. Beyond the wetland lies a very hostile, arid environment. The nomadic tribes move with the floods, relying on the waters to graze and water their cattle or provide fish.

Despite the wetland's value, it faces a number of threats. In the 1980s, a 260km stretch of a planned 360km canal was dug, with the aim of diverting 4.7 billion cubic meters of water annually to Egypt and Sudan for irrigation. The project was halted by the civil war but if re-instigated could have drastic environmental consequences. Various dams are presently planned upstream of the Sudd, which could also affect its seasonal water flows. And with the recent discovery of hydrocarbons in the region, oil exploration is under way. "Drilling is already under way but there are no regulations in place and no monitoring of pollution," says Rebelo. "With the on-going difficulties in gaining access to monitor and assess the current status of the wetland and changes within it, it's even more important to generate the information needed using the satellite data."

"Seeing the Sudd from Space", 01/02/2013, online at: http://wle.cgiar.org/blogs/2013/02/01/seeing-the-sudd-from-space/

BACK TO TOP

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❖ New water retention technology quenches crop thirst in drought conditions

With climate change predicted to increase the severity and frequency of drought events in many part of the world, water conservation is a growing concern. New water retention technology developed at Michigan State University (MSU) could help quench the thirst of parched crops while using less water, not only enabling crops to better deal with drought, but also improving crop yields in marginal areas.

Coarse, sandy soils found in semi-arid and arid regions have large pores that absorb large quantities of rainfall. However, they retain less than 20 percent of the water in the root zone that sits between the surface and depths of 60 to 70 centimeters (24 to 27 inches), leaching losses of nutrients and other chemicals into ground water as the water drains away.

The subsurface water retention technology (SWRT) developed by Alvin Smucker, MSU professor of soil biophysics and MSU AgBioResearch scientist, strategically places polyethylene water barrier films at various depths in the soil. The membranes are flexible, allowing them to be shaped to maximize water retention and provide space for root growth.

The films, which are installed using a specially designed barrier installation device (BID), retain water within the upper 70 to 100 centimeters (27 to 39 inches) of the soil, which Smucker claims has the potential to increase water retention efficiencies by up to 20 times. With proper spacing of the films, excess rainfall is also able to drain away.

Aside from the potential water savings, the films also promise to cut fertilizer costs and reduce groundwater contamination by agricultural chemicals. The polyethylene barriers are also faster and less labor intensive to install than asphalt barriers, as well as being more durable, lasting at least 40 years.

Prototype tests carried out in drought conditions saw irrigated sands produce 145 percent more cucumbers than control fields without the films, and also increased corn yields 174 percent. In addition to agricultural crops, the technology could also be used to increase the yield of cellulosic biomass feedstock used for fuel production that are grown on marginal lands.

"This technology has the potential to change lives and regional landscapes domestically and internationally where highly permeable, sandy soils have prohibited the sustainable production of food," Smucker says. "Water retention membranes reduce quantities of supplemental irrigation, protect potable groundwater supplies, and enable more efficient use and control of fertilizers and pesticides."

A team will test the patent pending technology "in the field" on farms in irrigated sandy regions of southwestern Michigan as well as semi-arid and arid regions of the south western and mid western U.S. with MSU researchers also looking at implementing the SWRT films in global locations susceptible to drought.

Smucker is working with MSU's technology and commercialization office, to commercialize the technology.

"New water retention technology quenches crop thirst in drought conditions", 31/01/2013, online at: http://www.gizmag.com/msu-subsurface-water-retention-technology/26066/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=dd2ddef81f-RSS_EMAIL_CAMPAIGN&utm_medium=email

BACK TO TOP

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❖ Colorado digs to find water as aquifer-dependent residents fret

A project that could pump enough water from underground aquifers to serve 100,000 more people along Colorado's Front Range is moving ahead — even as communities pledge to reduce dependence on such finite sources of water.

Two test wells drilled deep beneath Douglas County-owned open space, between Denver and Colorado Springs, found abundant water and good pressure, consistent with 1995 estimates by the state engineer. Permanent facilities — including pump stations — are being installed so that the aquifers can be tapped.

Project leaders at Sun Resources Inc. said they could pump up to 17,500 acre-feet a year and are talking with municipal and private parties in Douglas and El Paso counties — but haven't signed contracts.

Pumping more from aquifers "should not be ignored as a partial solution to a lot of people's problems," said Gary Pierson, president of Sun Resources, a company owned by Denver billionaire Phil Anschutz. "Water is becoming a problem in Colorado, Kansas, Texas, California, Nevada and across the country. People need to be sensible and have well-thought-out plans."

Along the Front Range, proposed new housing developments increasingly face water constraints as local governments push developers to show they've lined up enough water to sustain residents at maximum build-out — in line with a recent court ruling. And leaders warn that underground water levels in recent years have fallen by as much as 30 feet a year.

"We've got to get out of aquifers. That's not a sustainable source of water. We've got to move to renewable sources," Douglas County Commissioner Jack Hilbert said.

"If I had my preference, I'd love the water to stay under Greenland Ranch. But it is a private-property right," he said. "Now, if they want to take that water and use it in Douglas County somewhere, then we can have that conversation."

Sun Resources' conversations have included Castle Rock authorities, whose 50,000 residents rely mostly on aquifers. The city needs an additional 15,400 acre-feet of water, said Heather Beasley, city water-resources manager.

"Our focus is to secure renewable water," Beasley said. "We haven't rejected them. We've talked to them. We tell them, if you can get it to us for less than what we are paying now, we can strike something."

However, in Larkspur (population 286), town managers are worried that the project could deplete aquifers, draw down existing wells and disturb the ecology of the creek running through town if it is used to transport the pumped groundwater.

Town Manager Matt Krimmer said he has tried to discuss concerns with Sun's attorney, wondering how much might gush through Plum Creek and affect water quality and wildlife.

Krimmer hasn't been able to see results from the test wells. Sun has asked state environmental overseers to keep that data confidential.

"My understanding is those wells can be started at any time," Krimmer said. "The impacts to surrounding properties and surrounding communities, in my mind, take precedence over the proprietary information of a private corporation.

"If there's going to be an impact, next year or in 100 years, that needs to be brought to the attention of property owners who could be affected."

Talks with potential buyers of the water are aimed at determining water demand along Colorado's semi-arid southern Front Range — where residents currently rely heavily on more than 38,000 acre-feet a year pumped from at least 440 municipal wells that tap the aquifers.

Once future needs are determined, Pierson said, Sun will decide what business plans — if any — to put in place.

No proposal to convey water by pipeline or creek had been filed with the U.S. Army Corps of Engineers. Parts of Plum Creek are designated as critical habitat for the endangered Preble's jumping mouse, and a project could require review by the U.S. Fish and Wildlife Service, Colorado field supervisor Susan Linner said.

"If you were having higher flows in creeks, that could eventually affect the habitat for the species," Linner said. Timing of flows, too, could affect habitat, she said. "A little bit of water might actually be good for the species."

Piping aquifer water along faint creeks does have an appeal: better green corridors. Douglas County's Hilbert suggested trout-fishing and kayaking areas.

The amount of water under the county's Greenland Ranch open space was estimated 18 years ago using a formula. A state water court decreed that there are 3.8 million acre-feet available. Applying the state law that says pumping must not deplete aquifers sooner than 100 years, the decree said about 38,000 acre-feet a year could be pumped. Sun doesn't own rights to all that estimated quantity.

The decree also says state officials retain jurisdiction to reassess the amount of water based on hard data once wells are drilled. State officials will do that "when the time is right," deputy state engineer Kevin Rein said. "Just with two wells, spaced very close together at one side of the land," he said, "we're not really able to use those to extrapolate" how much is there.

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Worried about water

A statewide poll released Friday shows Colorado residents are as worried about water supplies and related water issues as they are about jobs.

The poll of 710 voters by Public Opinion Strategies and Keating Research found 70 percent are extremely worried about drought, compared with 66 percent extremely worried about jobs.

About 66 percent of those polled said they are extremely worried about water supplies and the availability of water for agricultural production of food.

More than half said they are gravely concerned about water in relation to wildfire conditions in forests and the relatively faint flows in rivers.

The telephone poll, which included cell and land-line numbers, was conducted Jan. 20 through Tuesday. The margin of error is 3.7 percent.

"Colorado digs to find water as aquifer-dependent residents fret", 27/01/2013, online at: http://www.denverpost.com/environment/ci_22458254/colorado-digs-find-water-aquifer-dependent-residents-fret?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=fc10fd02ce-RSS_EMAIL_CAMPAIGN&utm_medium=email

BACK TO TOP

❖ In Mexico City, Harvesting Water from the Sky

The Ajusco district at the southern edge of Mexico City is part of Mexico's surging capital, but you would never know it. It is almost rural. Aside from the occasional car or motorbike on a dirt road, the only sound is a radio playing somewhere in the neighborhood.

And there is another, less obvious sign of Ajusco's isolation from the rest of the metropolis. Most homes here have at best only intermittent access to the city water system.

Eusebia Santa Ana Gutierrez says in Spanish that for most of the time she has lived here, she has worried about water. Service has been erratic, she says, and she has never had enough. Sometimes it has gotten so bad, she has had to visit friends or family in the city center to wash her clothes or take a shower.
Gutierrez's situation is typical of tens of thousands of people here on the outskirts of Mexico City. But even in the more developed urban areas, roughly 30% of the city's residents have only sporadic access to water. That means millions of people.

The main problem is that as the city's population continues to surge – now beyond 21 million residents, the aquifer beneath the city is being depleted.

And that is where Enrique Lomnitz comes in.

Isla Urbana
Lomnitz is the director of Isla Urbana, a local environmental group that is pushing what it says is a simple solution to at least part of Mexico City's water crisis — rainwater harvesting. Lomnitz says, "As the water situation gets worse and worse, our proposal gets stronger and stronger."

He explains that rainwater harvesting is a natural fit in Mexico City, since over a million homes already have tanks, or cisterns, for storing water from either the intermittent city water system or delivery trucks.

He says, "So you put a rainwater harvesting system into [a] house. You don't have to buy a cistern because these things are already part of the house's infrastructure. And it's not a novel concept for a family to have a whole bunch of water come into their cistern at once, and then use that water so that it lasts as long as possible. This is something that people are very used to doing."
Lomnitz says water from the rainy season in the summer and fall can supply a household for up to six months. And with tanks already in place, he says Isla Urbana's system is quick and easy to install. All that is required are some new gutters to channel the rainwater, new plumbing to draw off the first flush of water in a rainstorm, which is often contaminated with air pollutants, and a couple of special filters. The total cost is no more than six hundred bucks per household.

He and his team have already installed close to a thousand systems in Mexico City, split between the rural outskirts and the urban center.

Rainwater Skeptics
Not everyone is convinced of the benefits, however.

Victor Carrillo lights a blowtorch in his workshop to weld two copper pipes together. He used to be a bus driver, but now he works for Isla Urbana, training plumbers to install rainwater systems. He says it can be a tough sell.

Carrillo says in Spanish that plumbers sometimes make fun of the program. They do not understand the culture of rainwater harvesting.

But after the training, he explains that most of the plumbers eventually come around, and they see the benefits.

That is not the case, however, for city officials.

"It is not a solution," says Ramón Aguirre Díaz in Spanish, the Director General of Mexico City's Water System. "It sounds intelligent and ecological. But that is it – it just sounds good."

Aguirre Díaz says the cost and the extra technology put rainwater harvesting out of reach of the vast majority of Mexico City's homes.

And he says the problem this giant city has with its water cannot be fixed with a single approach. They need to rely on many ideas, like reducing demand and increasing water reuse, fixing leaky water mains, and bringing more water in from outside the city.

Enrique Lomnitz and his colleagues at Isla Urbana agree that rainwater harvesting is not going to fix Mexico City's water problems entirely, but he believes it has much greater potential than the city gives it credit for. And he says their approach is already making a big difference for people who have installed their systems.

Water from the Sky

Eusebia Santa Ana Gutierrez (on the outskirts of the city) is one of these people. Isla Urbana helped install a rainwater harvesting system in her home last year. Fifteen of her neighbors have done the same.
Gutierrez casts a bucket down into her water tank, still half-filled, even though it has been two months since the last rain. She can see her reflection in the water below.

She shows off the water she uses to wash her clothes and her dishes. She even drinks it, though Isla Urbana does not advise it. She says, "It is crystal clear, this water that came from the sky."

Gutierrez is relieved that she has not had to worry about her water for the past few months. She also says she is saving enough money from not having to buy water to build a little extension onto her home. Once it is complete, she plans to collect even more rainwater from her expanded roof.

She is proud of her setup, here on this dirt road at the edge of Mexico City. And the name of that road is Tlaloc – the Aztec god of rain.

"In Mexico City, Harvesting Water from the Sky", 31/01/2013, online at: http://www.theworld.org/2013/01/in-mexico-city-harvesting-water-from-the-sky/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=dd2ddef81f-RSS_EMAIL_CAMPAIGN&utm_medium=email

BACK TO TOP

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❖ Editorial, 1/29: New era on water policy

Conflicts between irrigators and domestic well users "just exploded" last year in northeastern Nebraska, according to Stan Staab, general manager of the Lower Elkhorn Natural Resources District.

The tension might be a harbinger of things to come in other parts of eastern Nebraska if the drought continues, and if predictions are accurate that Nebraska may have a more arid climate due to climate change.

The response of the NRD may provide evidence of what works and what does not to cope with less rainfall.

In order to resolve the conflicts, the NRD spent more than $100,000 – up to $1,500 per household – to help pay for deepening wells or taking other measures so that residents in the area could have water to drink, shower, take baths and wash clothes. "We have never had anything like this in our district … no history at all," Staab said.

The move by the NRD was not entirely altruistic. A 1978 Nebraska Supreme Court ruling on a dispute in the area set a precedent that the irrigators pumping from a large capacity well would be responsible for restitution to owners of a well that supplies drinking water.

The expense can be considerable. Karen Mackel told the NRD board it cost $11,000 to deepen her well. An elderly couple, who used water from their dehumidifier last summer to wash dishes, was told it would cost $20,000 to deepen their well.

Last week, the NRD became the first in Nebraska to impose water allocations on irrigators. In one subarea, center pivot irrigators will be allowed to spray up to 13 inches of water. In another, the limit is 14 inches. The irrigators will be required to install flow meters to record usage.

In addition, the NRD said that no new farmland will be approved for irrigation.

The "flash drought" that hit last summer reminded Nebraskans in the eastern part of the state that they cannot take water for granted. That's a relatively rare occurrence in a state with a plentiful

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supply of groundwater. Eighty percent of Nebraskans drink from groundwater supplies that are so free of contamination that no treatment is necessary.

Things are changing in both rural and urban areas. In Lincoln, city officials are studying a new rate structure to encourage conservation. With new technology and new methods, irrigators have been able to cut back as much as two inches in applying water without reduction in crop yields, according to the University of Nebraska-Lincoln Water Center.

"I think a lot of other districts are looking at us," Staab said.

He's right. As a speaker said at an overflow workshop put on by the NRD last year, "everybody's on edge because we have water issues."

"Editorial, 1/29: New era on water policy", 28/01/2013, online at: http://journalstar.com/news/opinion/editorial/editorial-new-era-on-water-policy/article_d63c2109-04ac-567f-b196-564813142a9e.html?comment_form=true

BACK TO TOP

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