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Issue 74

ORSAM WATER BULLETIN

30 April- 06 May 2012

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***** Work begins on 6 billion Turkish Lira irrigation dam in Silvan

Turkey takes another step in reaching its ambitious agriculture plans as four ministers mark the groundbreaking of a large dam in Diyarbakır's Silvan. The dam may help local farmers boost earnings by 884 million liras annually

Construction work for the Silvan Dam, in the southeastern province of Diyarbakır, which will be the largest dam of its kind in the country after the <u>Atatürk</u> Dam, began yesterday with a ceremony attended by four Cabinet ministers.

The project will cost 6 billion Turkish Liras and promises a boom in agriculture in the country's lessdeveloped southeastern region, as it will irrigate an 2,500 square kilometers of land. Farmers on this land will earn an additional 884 million liras annually.

Supporting development

"This project is a critical irrigation investment. Once it is completed, there will be a huge boom in agricultural production," Development Minister Cevdet Y1lmaz said at the ceremony. He added that the project would create employment for hundreds of thousands of people in the region, and that the government would not shy away from making any sacrifices necessary to bring the development of the region up to par with the western part of the country.

The Silvan Dam is a part of the broader GAP program, an ambitious plan to irrigate some 10,600 square kilometers. Finance Minister Mehmet Şimşek explained that the government had set aside a huge budget of 1.4 billion Turkish Liras for GAP, but that at Prime Minister Recep Tayyip Erdoğan's request the number has been raised to an average of 3.5-4 billion liras per annum. Exports from the southeastern region have increased tenfold since 2002 to \$689 million, Şimşek said, emphasizing both the development and the importance of the region.

Forestry and Waterworks Minster Veysel Eroğlu said he sometimes jumps out of bed in the morning saying "Silvan, Silvan." He noted that the dam at Silvan would be 174.5 meters high and have a volume of 8.5 million cubic meters.

"Building the dam isn't enough, however. We need two huge 11.5 kilometer-long tunnels, seven meters wide, to provide irrigation," Eroğlu said. At the close of the ground-breaking ceremony, Eroğlu signed a contract stating that the dam would be completed by Sept. 9, 2016, before 12 a.m.

"Work begins on 6 billion Turkish Lira irrigation dam in Silvan", 05/05/2012, online at: <u>http://www.hurriyetdailynews.com/work-begins-on-6-billion-turkish-lira-irrigation-dam-in-silvan.aspx?pageID=238&nID=20021&NewsCatID=344</u>

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Solution Flooding out terror? Turkey's Ilisu dam project

You may have heard of dams being built for water management purposes or electricity production, but probably not one being built for counter-terrorism purposes. Turkey's proposed Ilisu Dam on the Tigris River would satisfy just that end.

When Ankara completes the proposed construction on the dam in 2013, a large artificial reservoir would flood canyons across the rugged terrain of southeastern Turkey, thus effectively flooding out the Kurdistan Workers party (PKK) from the area and scoring a rare "hydro-victory" against terrorism.

The Ilisu Dam project is part of the government-funded Southeastern Anatolia Project (GAP), which traces its origins to the early days of the Turkish republic when plans to utilize the Euphrates and Tigris rivers for energy generation and irrigation were first developed. However, GAP it still awaiting completion. Major fighting between the PKK and the Turkish military has prevented completion of the project since the 1990s.

The PKK has enjoyed a great deal of sway in southeastern Turkey, using the mountainous terrain to their advantage in order to smuggle its members into Turkey from camps in Iraq. This area, which one of the authors visited, is pierced by canyons that run for tens of miles and are hundreds of feet deep. These canyons are almost impossible to properly monitor with a military force and form an effective land bridge between Iraq and Turkey that the PKK have used for decades.

In fact, it would not be exaggerated to describe these canyons as sort of a "PKK highway"; a member of the group can enter one of these canyons in Iraq and literally walk hundreds of miles deep into Turkish territory undetected.

Now this could all change: the large artificial lake to be created by the construction of the Ilisu dam would flood these canyons, blocking the "PKK highway."

Perhaps not so fast. Soon after work on the dam began in 1997, however, the consortium of Swiss, German, and Austrian banks financing the dam began voicing their concerns with the project and withdrew their monetary support. In late 2008, the European members of the Ilisu Dam consortium put a six-month freeze on financing because the project "failed to meet World Bank standards for environmental and cultural protection."

The World Bank raised concerns over the Ilisu dam project because it would flood the historic Tigris River town of Hasankeyf, which was once an important stop on the Silk Road connecting Asia to Europe. This town also serves as a source of income for the over 3,000 residents who depend on the 2 million tourists who visit the site every year.

Some Turkish activists have even tried for some years to have Hasankeyf added to UNESCO's World Heritage list, but this would require the Ankara government's signature, which has been unattainable. Some Turks have also taken the issue to the courts and attempted to establish that Hasankeyf is protected by Turkish laws on the preservation of historical and cultural sites and



therefore under the protection of the European Convention on the Protection of the Archaeological Heritage due to Turkey's signatory status.

In order to alleviate concerns raised by the World Bank, its European Union partners, and the area's residents, the Turkish government has proposed moving 12 of Hasankeyf's 300 monuments to a newly created cultural park about a mile north of the city. Turkish government officials have also proposed the construction of Yeni (new) Hasankeyf in order to relocate the area's over 3,000 residents.

Ankara argues that the dam should be built for it would bring prosperity to the country's poorest region; by providing water for otherwise dry but fertile lands along the Tigris. The Ilisu Dam would also prove to be an important source for domestic energy production. Due to a growing economy, Turkish energy consumption has risen by 46% since the year 2000. When complete, the Ilisu Dam will have a capacity of 1,200 MW, making it Turkey's fourth largest dam in size, and second biggest in generative capacity. Yet, in all truth, the dam's counter-terrorism potential appears perhaps far more useful and valuable to Ankara.

For Turkey, the construction of the Ilisu Dam will kill two birds with one stone. It will help develop the largely poverty stricken southeast corner of Turkey, generate cheap domestic energy, and most importantly cut off a vital land route used by the PKK between their bases in Iraq and Turkish city centers.

For its opponents, the dam is viewed as the ax that will sever the head of the historic town of Hasankeyf and displace thousands of Kurds in a region that is already dealing with rising ethnic tensions. What is yet to be seen, however, is whether Ankara will be successful in its attempt to relocate ancient monuments and properly relocate and compensate the civilian population that will be displaced as a result of the dam.

Then, the Ilisu Dam project could enter the annals of counter-terrorism as the first case of using water to defeat terrorism.

The views expressed in this article are solely those of Soner Cagaptay and Altay Sedat Otun.

"Flooding out terror? Turkey	/'s Ilisu dam project", 03/05/2012, online at:
http://globalpublicsquare.blogs.cnn.com/2012/05/03/flooding-out-terror-turkeys-ilisu-dam-project/	

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President Orders Facilitated Construction of 2 Dams in Northern Iran

TEHRAN (FNA)- Iran's President Mahmoud Ahmadinejad issued an order to accelerate the construction of two important dams in the country's Northern province of Mazandaran.

According to Mazandaran governorate, the president has ordered the power ministry to provide the needed credits for the construction of Golourd Dam and completion of Shahid Rajayee irrigation dam.

The president asked the power minister to accomplish both projects in the remaining years of his office.

He also ordered accelerated accomplishment of yet another project for transferring Shahid Rajayee's water reservoir to supply drinking water for the provincial capital city of Sari.

Iran has a leading dam construction industry and ranked third among the world dam builders last year.

In October, Iranian First Vice President Mohammad Reza Rahimi said that the country ranks first in the region and third in the world in this field.

"At present, Iran ranks third in the world in dam construction while our dam building industry is unrivaled in the region," Rahimi said.

He further underlined Iran's progress in the hi-tech and power generation industry, and said, "Despite the sanctions imposed against the country in the past 33 years, Iran is presently the first electricity producer in the region and the 16th in the world."

Rahimi said that there are 135 dams under construction which, once operational, will help to the development of agriculture nationwide.

Iran is now viewed as a leading country in dam building. Iranian specialists now provide consultation services for the design and construction of various dams in different sizes.

According to the Iranian officials, many countries including Sri Lanka, Syria, and Tajikistan as well as African states have entered either dam construction or consultation projects with Tehran.

"President Orders Facilitated Construction of 2 Dams in Northern Iran", 06/05/2012, online at: http://english.farsnews.com/newstext.php?nn=9102110799



* Ancient documents in Iraq offer climate clues

SUMMIT COUNTY — Spanish scientists have tracked a series of unusual cold snaps in the Middle East by translating written documents recorded by Arab historians.

Through painstaking work, the research team has constructed a chronology of climatic events between 816 and 1009, when the region apparently experienced regular cold spells and even snowfall.

"We have recovered an interesting chronology of climatic events, such as droughts, floods, rain, frost, heat and cold waves as well as strong winds during the period between 816-1009 in the areas now known as Iraq and Syria," said Fernando Domínguez-Castro, lead author and researcher in the Physics department at the University of Extremadura.

This study, published in the *Weather* journal, highlights a high number of cold waves. "The period between 902 and 944 had a high number if we compare them to current weather data. Examples of this are the six snowfalls that occurred in that period, whilst in our era, we only know of one snowfall in Baghdad on 11 January 2008" Domínguez-Castro highlights.

The research team was especially surprised by the "unexpected" drop in temperatures in July 920. According to the documents analyzed, the people of Baghdad had to come down from their roofs (where they would usually sleep in the summer) and go inside their houses and even use blankets. The temperatures could have dropped 9 degrees Celsius compared to the current average for the month of July.

"It is difficult to identify the cause of this drop in temperature, but it could be due to a volcanic eruption the year before, as it is common for summer temperatures to drop in these cases" the expert points out and says that during some of those nights in July 920, temperatures did not exceed 18°C.

There were two significant volcanic eruptions during that period, which could be the cause of the cold waves, "although there is a lot of doubt surrounding the dates", the researcher states. One of those was the Ceboruco volcano (Mexico), around 930, and the other was the Guagua Pichincha (Ecuador), around 910. Nonetheless, "more evidence is necessary to confirm this hypothesis" the expert warns.

The research shows that during the first half of the tenth century, the cold climatic events in Baghdad were more frequent and more intense than today. Although in the Iraqi city only two days with temperatures below 0°C were registered between 1954 and 2008, there were at least six very cold days in a 42 year period in the tenth century.

Baghdad, the center of the empire

In 762, Abu Ja'far Abdallah al-Mansur, the second Abbasid Caliph (the second Islamic dynasty), founded the city of Baghdad and established it as the capital of the empire. The city soon became the



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most prosperous place at the time, and the centre of international trade and agricultural development, which attracted a growing population.

Historians of the era debated reasons as to why the Caliph gave so much importance to Baghdad. As well as its strategic location between the Tigris and Euphrates rivers, the city had good weather conditions. "There was plenty of water, the weather was very warm in the summer, very cold in the winter, and moderate in spring and autumn," Al-Ya`qubi described, author of a geographical treatise in 891.

"Ancient documents in Iraq offer climate clues", 02/05/2012, online at: http://summitcountyvoice.com/2012/05/02/ancient-documents-in-iraq-offer-climate-clues/

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MENA Is Changing Drastically & NASA Has The Pictures To Prove It

Unless you have been living in a consumer-induced coma, it will not have escaped your attention that the world is under serious environmental stress. And a large chunk of that stress has been human-induced. Whilst the exact influence of human behaviour is hard to measure, the carbon we keep pumping into the atmosphere is definitely not helping.

Indeed we are seeing more floods, droughts, melting ice, desertification and a continued gutting of our seas. The Middle East is no different and <u>NASA has the pictures</u> to prove it. So brace yourself – this is not going to be pretty.

Lake shrinkage in Iran

Iran's Lake Oroumeih (also spelled Urmia) is the largest lake in the Middle East and the third largest saltwater lake on Earth. But dams on feeder streams, expanded use of ground water, and a decades-long drought have reduced it to 60 percent of the size it was in the 1980s. Light blue tones in the 2010 image represent shallow water and salt deposits. Increased salinity has led to an absence of fish and habitat for migratory waterfowl. At the current rate, the lake will be completely dry by the end of 2013.

Urban Growth in Morocco

The Moroccan cities of Agadir, Inezgane and Tikiouine are close to the Atlantic coastline (seen in blue in the images), and stretch into the foothills of the Atlas Mountains. Agadir was nearly destroyed by an earthquake in 1960. Reconstruction has focused on tourism, turning this area into a winter destination. The 1985 image shows the area 25 years into the rebuilding. By 2011, the urban areas reach into the Sahara Desert. Growth has been influenced by the expanding fishing industry and modern commercial ports.

Oil fires of War in Kuwait

Iraqi forces set hundreds of oil wells ablaze during the US-led Gulf War following Iraq's invasion of Kuwait in 1991. Some six million barrels of oil per day went up in smoke. Residue darkened the normally light-colored soil, as seen in the 1991 image. By 2011, the environment has largely recovered. Smoke plumes in the latter image are from fires normally set to burn off gases from the wells.

Agricultural Growth in Saudi

Only a few centimeters (about one inch) of rain falls in the Saudi Arabian desert each year, but crops still grow thanks to aquifers deep below the surface, which contain water trapped during the last Ice Age and rainwater that fell over several hundred thousand years. Saudi Arabia drills through the desert floor and irrigates the fields with a circular sprinkler system known as center-pivot irrigation.

Hydrologists estimate that it will be economical to pump this water only for about 50 more years. In these images, the agricultural fields are about one kilometer (0.62 mile) across. Healthy vegetation



appears bright green while dry vegetation looks orange. Barren soil is dark pink and urban areas, like the town of Tubarjal at the top of each image, are purple.

Lake degradation in Tunisia

Although the water level in lake Ichkel is higher, a large part of the lake appears red due to the presence of aquatic plants. Ichkeul Lake and wetlands are a major stopover point for hundreds of thousands of migrating birds who come to feed and nest. It is the last remaining lake in a chain that once extended across North Africa, and has badly deteriorated as a result of the construction of three dams on rivers supplying it and its marshes, which have cut off almost all inflow of freshwater. The Tunisian government plans to undertake various measures to retain freshwater in the lake on a year-round basis and reduce the salinity of the lake.

The impact of dams in Turkey

In 1990, a series of seven dams was started in the Goksu River basin to provide long-term hydroelectric power to the region. Government officials and others are using Landsat satellite data to monitor the growth and impact of these dams, since the Goksu is one of the few remaining free-flowing rivers in Turkey. The Gezende dam, completed in the early 1990s, reduced flow downstream and significantly affected aquatic species, while construction of the Ermenek dam in the early 2000s created a large reservoir that flooded fragile wildlife habitat.

The Dead Sea's Water

The Dead Sea is one of the world's saltiest bodies of water, too salty to harbor any life other than bacteria. Minerals from the sea, however, are extracted for various industrial purposes. Mineral evaporation ponds have replaced open water in the southern part of the sea, as can be seen in the 2011 image. In recent decades, the Dead Sea has shrunk as water has been diverted from the Jordan River, the sea's main tributary. A plan has been announced to replenish the Dead Sea by building a canal from the Red Sea, providing fresh (desalinated) water to Jordan en route.

Urban Sprawl in Saudi's Capital

Over time the population of Riyadh has soared from about half a million to more than two million. In the early 1970s, three times as many Saudi Arabians lived in rural areas as in cities. By 1990, the ratio had reversed — cities held three times as many as the rural regions.

Agricultural growth in Libya

With among the least renewable water of the North African countries, Libya relies on groundwater to meet 95 per cent of its water needs. In the 1960s, the discovery of water in deep aquifers under Libya's southern desert inspired an enormous water transfer scheme — the Great Man-Made River Project, one of the largest civil engineering enterprises in the world. These images show the increase in irrigation in the Murzuq Basin in southeastern Libya made possible by water drawn from the east and northeast Jabal Hasaouna well fields.



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Lake Shrinkage in Egypt

In the mid-1990s, excess water was channeled from the Lake Nasser reservoir on the Nile River to the Toshka Depression in the Western Desert, creating a series of lakes. This "New Valley Project" was to relieve overcrowding within the Nile Valley and boost the economy. Despite soil poorly suited to irrigation, the area produced grapes, cantaloupes, tomatoes, cucumbers, citrus fruits and wheat. But Lake Nasser water levels fell after 1998 and flow to Toshka ceased in 2001. At the current rate of decline, the new lakes will be lost to evaporation within the next few years.

"MENA Is Changing Drastically & NASA Has The Pictures To Prove It", Arwa Aburawa, 01/05/2012, online at: <u>http://www.greenprophet.com/2012/05/mena-nasa-images/</u>

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* 'Yarmouk water sharing violations require political solution'

YARMOUK/IRBID — Political action is needed to resolve the standing issue of persistent Syrian violations of a water-sharing agreement concerning storage in the Wihdeh Dam and exploitation of the Yarmouk River, outgoing water minister Mousa Jamani said on Thursday.

For several years, Jordan has been asking Syria to remove dams and wells established along the Yarmouk River, which reduce water flow and prevent cultivation upstream and downstream of the Wihdeh Dam, he added.

Communications are still ongoing with the Syrian government to end violations depriving Jordan of its legitimate water share, but the violations continue, he noted during a tour organised by the Ministry of Water and Irrigation to the Yarmouk River and Wihdeh Dam. The visit was intended to reveal whether the unstable political conditions in Syria had affected the flow of the shared river and the 110 million cubic metre (mcm) Wihdeh Dam, according to Jamani.

"The violations over the Yarmouk River and Wihdeh Dam, which currently holds 20mcm of water, didn't increase due to the unstable conditions in Syria, but violations to Jordan's water share remain," he told reporters.

Jordan and Syria signed an agreement in 1987 to regulate water sharing between the two countries, Jamani said, noting that under the agreement, Syria has the right to use 6mcm of the Yarmouk River downstream of the Wihdeh Dam to irrigate land along the riverbank.

"Cultivation on the Syrian side of the river is consuming more than the allocated amount because pumps and pipelines are extended to irrigate farms that are not along the riverbank," Jamani noted.

The Yarmouk River is a tributary of the Jordan River, originating in the southeastern slopes of Mount Hermon and forming a boundary between Syria and Jordan for nearly 40 kilometres before becoming the border between the Kingdom and Israel.

"The solution to Yarmouk Basin water sharing is not technical, it is political," Jamani said.

He noted that the since the agreement was signed, the number of Syrian dams increased from 26 to 48, while around 3,500 wells were drilled to pump water from the river basin.

"The underground water in the basin is the source of the springs that feed the Yarmouk River. The more wells are drilled, the less water flows," he said.

Until the 1960s, the Yarmouk River's flow used to reach 16 cubic metres of water per second, but has since dropped to one cubic metre per second.

'Yarmouk water sharing violations require political solution', Jordan Times, 30/04/2012, online at: http://mideastenvironment.apps01.yorku.ca/?p=4892

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* A solution for our seas and shores?

Groups say creation of a new government body could be the answer to averting potential disaster on our beaches.

By Zafrir Rinat

wo groups who warn Israel's coastline is in danger of being destroyed say they have the solution to salvage it. The Zalul Environmental Association and the Department of Marine Geosciences at Haifa University say the government can save our seas and shores from ecological disasters that might otherwise be inevitable, if it streamlines its authority over them. Thus, they have come up with a joint initiative to establish a single government body that will determine policy and oversee sea and shore activities, with an eye toward averting negative environmental consequences and preserving our natural resources. Government authority in this area is now split between land and sea, and spread among different ministries.

"We are currently mapping the authorities upon which to base a sea and shore office," says attorney Nadia Mogilevsky of Haifa University. The authority of the Environmental Protection Ministry branch that is now responsible for many of these areas is rather limited. It can act to enforce sea pollution laws but it has no power to determine policy."

The new proposal suggests creating an umbrella body for pollution prevention, supervision of fishing and overseeing of water quality; currently these fall under the responsibility of the Ministries of Environmental Protection, Agriculture, and Health, respectively. "This doesn't mean that these departments must be moved to the [new] authority, but that it would supervise them," Mogilevsky says.

The idea of an independent new agency prompts concerns from critics, however, that it would be vulnerable to pressure from parties who might have political or economic reasons to interfere with its decisions. Haifa University staffers and members of Zalul argue that such pressure could be avoided by other voices being added to the decision-making mix – those of public representatives, other environmental bodies and local governments.

Initiators of the initiative expect to run into considerable opposition as they attempt to gather support in the Knesset for a bill to establish a sea and shore authority, since it would take power over a significant amount of money away from existing government offices. But they say it is clear that Israel's economic dependence on the sea, which serves as a gateway to the rest of the world, demands extremely responsible management; they hope a responsible authority can be established before a large environmental and economic disaster takes place.

The Ministry of Environmental Protection is supposed to protect marine resources, but its sea and shore branch lacks the personnel to keep track of such large expanses of sea and to effectively supervise its far-flung infrastructure. The Energy and Water Resources Ministry has begun to use experts on its behalf, in cooperation with the Environmental Protection Ministry, to create mandatory guidelines for gas and other companies in order to protect the marine envir onment. The two ministries plan to broaden the national sea supervisory project managed by the Israel Oceanographic and Limnological Research Institute, to include deep water as well as the shoreline.



Risk of disaster to rise

Still, exploitation of Israel's coast and seas will soon rise significantly, with the construction of more desalination plants and natural gas drilling sites. While these installations may be of great benefit in providing energy and water, there is concern that they could damage the natural environment and may even cause an ecological disaster with severe economic consequences. Israel faces the challenge of developing an effective governmental mechanism to gather data on the state of the sea, weigh risks and mandate steps that will prevent such a disaster.

A pipeline leak or a broken drill would be examples of potential disasters, since gas and oil installations in the sea require the establishment of drill and pipeline infrastructures in areas that are highly sensitive in ecological terms. A leak or broken drill could cause widespread pollution, as happened as a result of the 2010 oil spill in the Gulf of Mexico.

In addition to sites in the Mediterranean Sea where gas has already been discovered, 15 more will be probed for gas or oil. A number of large platforms for treatment of gas are to be built on the shoreline and two pipelines leading from the sea to the beach will be installed. Gas drills can also threaten the environment. A gas installation in the North Sea operated by Shell was the site of a leak last year that will likely pollute the sea with carbons poisonous to plant and other marine life.

Desalination plants can also have a negative influence on the marine environment. The plants send concentrations of the salt that remains after water is processed into the sea, where a salt desert is likely to be formed at the end of the pipeline. Chemicals used in the desalination process are also sent to the sea. Two senior researchers at the government's Israel Oceanographic and Limnological Research Institute recently warned that required checks on the environmental consequences of desalination are not being carried out.

And to all this we must add that plans to build undersea communications lines may further damage the seabed. There is already a serious problem occurring underwater, where the natural fish population is decreasing in numbers, in the wake of increased activities of fishing boats and as a result of the removal of sand from the sea in order to enlarge existing ports.

"A solution for our seas and shores?", Haaretz", 04/05/2012, online at: http://mideastenvironment.apps01.yorku.ca/?p=4934

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Water access spurs resentment in West Bank

JORDAN VALLEY -- Faisel Njoom undoubtedly has the best house in Auja. Drinking iced tea in the shade of his garden he talks with pride at being the biggest land owner in the village and the oranges and bananas that he once grew on his farm. Only later, standing in one of his dry and dusty fields in the Jordan Valley, does he become angry.

"Life without water is not a life," he said as the sun began to set. "This land without water is like all the other deserts. We were born working this land."

He says he couldn't keep farming because the irrigation channels to his land began drying up in 2000. He, and many charities, blame the digging of a new well near the Auja Spring, designed to serve a nearby Israeli settlement.

For first time in many years there is water flowing in the spring long after winter has finished because rainfall has increased by a fifth over the last year. Otherwise, the spring would now be dry. Almotaz Abadi, a consultant to the Palestinian Water Authority, explained that, rainfall is the biggest factor contributing to water availability, but the Auja Spring has been adversely affected by other factors, principally the new well.

The reminder of how plentiful water used to be in Auja has reignited resentment -- a feeling shared widely among Palestinians in the occupied territories. The World Bank and international charities accuse Israel of denying enough water to the Palestinians. Ironically, it's a situation made worse by the Oslo Peace Accords.

The Oslo II agreement in 1995 set up a joint water committee to oversee management of the aquifers in the West Bank. It was supposed to encourage consensus, but a World Bank report in 2009 concluded Israel dominated the process, taking 80 percent of the water resources. (In recognizing that the Palestinian Water Authority's powers were severely limited, the report also criticized its management abilities).

Agriculture is key to the Palestinian economy and its third largest employer. But it could be much bigger. The World Bank found that problems with irrigation are holding the sector back, especially when combined with the Separation Barrier cutting off land and access to wells.

Many Palestinians see this water divide as a way of increasing their dependency on Israel. Amnesty International estimates some 180,000 to 200,000 Palestinians living in rural communities have no access to running water. It means many have to buy water from Israeli tankers at high prices.

Israelis complain of water scarcity too. After much persuasion with an armed guard, NBC News was allowed to film inside Yitav, an Israeli settlement in the West Bank. It is indeed a green outpost in the desert, but the settlers say it comes at a high price – which they pay with their utility bills.

Israel's Water Authority disputes the claims made by the World Bank and other charities. At their offices in Tel Aviv we were shown a map of locations where licenses have been granted for



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Palestinian wells, but never pumped. "You have to know most of the Palestinian cities in the West Bank have better access to water than residents in Amman, the capital of Jordan," said Baruch Nager, Head of Water Administration for the West Bank.

Both sides have hydrological data to support their side of the argument, which makes it particularly hard to resolve.

Water is a 'final status issue' in the Palestinian-Israeli conflict. No decisions will be taken on how control of the water is divided until there is a peace agreement. That, of course, has never looked further away.

"Water access spurs resentment in West Bank", 04/05/2012, online at: <u>http://dailynightly.msnbc.msn.com/_news/2012/05/04/11506723-water-access-spurs-resentment-in-west-bank?chromedomain=worldnews&lite</u>

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* Israeli authorities demolish well near Hebron

HEBRON (Ma'an) -- Israeli authorities demolished a water well in a village east of Hebron on Wednesday, locals said.

Officials accompanied by soldiers tore down the well belonging to Saeed Jaber in Baqaa village, residents said.

Palestinian Water Authority chief Shaddad Attili warned earlier this year that Israel was systemically destroying well and rainwater harvesting cisterns to forcibly displace Palestinian communities who depend on them for their basic water needs.

At least 25 Palestinian wells and 32 Palestinian cisterns were demolished in 2011, he said.

Last week local director of the UN's humanitarian agency Ramesh Rajasingham said that more than 1,500 Palestinians have lost their homes as a result of demolitions and evictions since the beginning of 2011.

Palestinians can only build on one percent of the Israeli-controlled zone Area C in the West Bank, most of which is already built up, while settlements continue to expand in the same zone, the UN says.

"Israeli authorities demolish well near Hebron", 02/05/2012, online at: http://www.maannews.net/eng/ViewDetails.aspx?ID=481542

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Water-saving initiative makes women 'leaders of change' in communities

AMMAN — A new initiative is working to raise women's awareness of the country's water shortage and ways to reduce water consumption.

The Leaders of Change programme is promoting efficient use of the Kingdom's scant water resources at the household and community levels, Ministry of Water and Irrigation Secretary General Maysoon Zu'bi said on Sunday.

"The programme targets women with the aim of turning them into leaders of change in their local communities, especially as women control water use in households," Zu'bi added.

Through the initiative, communities nominate groups of active women to become leaders of change. These women receive practical and scientific training to raise awareness within their communities about Jordan's water problems and ways to cut down water use.

The programme is implemented in cooperation with the German Agency for International Cooperation (GIZ), the German Federal Institute of Geo-Science and Natural Resources (BGR), and the Jordanian Hashemite Fund for Human Development, which trains the nominated women on water issues, according to the ministry.

Jordan suffers from an acute water shortage and is globally categorised as the fourth most water-poor nation. As conventional water resources are depleted, management of water use and raising public awareness on the importance of water efficiency are vital to meet rising demand, according to experts and officials.

"Water-saving initiative makes women 'leaders of change' in communities – Jordan Times", 30/04/2012, online at: <u>http://mideastenvironment.apps01.yorku.ca/?p=4878</u>

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Russia France and Japan competing to building nuclear plant in one of world's driest countries

Much of the nuclear push in recent reports has focused mainly in other 3rd world countries to build NPPs, which is often fueled by claims that, the only way to sustain their existence is to open their doors to nuclear energy.

In the middle east, Jordan is struggling with support for its first nuclear reactor to supply badly needed electric power amid serious concern over environmental hazards and financial risks the cash-strapped kingdom would have to endure.

Jordan is one of the five driest countries in the world, but the kingdom says it needs nuclear technology to meet growing energy demands and to desalinate water. The government has already been obliged to rescind its original plans to build the reactor near the port city of Aqaba, near the Saudi border, after political pressure from Riyadh.

In Jordan, large-scale water desalination is factored into the Kingdom's strategy to secure clean water critical for economic growth. But this water is also necessary to cool the reactors. The reactor-generated power will, in turn, desalinate the water.

Opponents of Jordan's nuclear ambitions claim that potential financial, environmental and health costs outweigh the need to secure the country's energy independence.

Many citizens quoted as "environmentalists", or "activists" in the Jordanian press say they want the government to look into alternative methods of power generation using renewable sources such as solar energy or wind power. Several protests have been organized by different environmental groups in the past two months against the plans for nuclear power stations.

Dureid Mahasneh, an activist with Jordan Green Peace, criticized the government's nuclear plans.

"The government is not putting its national priorities in order. Our first priority is to deal with the water shortage. We might as well move ahead with the Red Sea-Dead Sea project [a canal that would supply 1.4 billion cubic meters of water a year] instead of building nuclear reactors. We do not have enough water to cool them down."

Despite the fact that the sun shines brightly nearly 90% of the year, inexplicably, Jordan has no commercial-scale solar generation. There have been few proposals for the installation of various wind farm projects, but even fewer turbines have materialized.

Jordan Atomic Energy Commission (JAEC) Chairman Khaled Toukan said that the nation will move forward with parallel talks with Russian, French, and Japanese firms for the construction of up to two 1,100-megawatt reactors, according to officially removing Canada's AECL and the CANDU EC6 reactor from the candidates list.

"Following a thorough examination, the offers provided by Russia's Atomstroyexport and a consortium by France's Areva and Japan's Mitsubishi were the best proposals that meet Jordan's



requirements," Atomic Energy Commission said in a statement. "The evaluation took into account the highest safety requirements, including lessons from the Fukushima event," it said.

According to reports, the JAEC will enter a nine-month negotiation period with the two firms before selecting the final vendor based on its financial offer and quoted electricity rates. "Talks with these companies will continue to address some technical issues, including the exact location of the plant," it added, according to state-run Petra news agency.

The successful bidder is expected to be announced by the end of this year, and the first unit of the proposed plant is targeting 2021 to begin operations.

The Belgian engineering consultancy Tractabel is assisting the JAEC to select a site for the country's reactor, which is due to start operation in 2020. The Belgian group has chosen Mafraq, 60 km east of Amman, and the Red Sea port of Aqaba as potential sites and planned to release the outcome of its study by the end of January, JAEC officials said.

For residents of towns near where the government said it will construct the reactor, the project is not a viable or safe option.

Community leaders symbolically bridged the gap by joined hands with environmentalists to lobby against the project on hope of pushing authorities reconsider placing what they term a ticking bomb away from their backyards. They have held several protests in their town and in Amman near the prime minister's office as well as near the nuclear energy commission's offices in protest against the project.

Basel Burqan, an environmentalists and anti-nuclear technology advocate, says residents of the northern town face serious health risks if the project is constructed within close proximity of their homes.

"The government is studying putting the reactor in a new location, in the desert of Azraq, but there is no water and that is also in violation of the international atomic energy regulations because there is no big source of water," Burqan told <u>The Media Line</u>.

Dominated by members of the influential tribe of Bani Hassan, Majdal doesn't accept the government's assurances over the plant's safety. Burqan says the town residents will oppose any move by the government to construct the reactor around their homes.

The government also promised the local community with good financial return, but residents vehemently refuse to budge.

Construction of the plant is expected to begin in 2015, said Kamal Al Araj, the deputy chairman of the atomic energy commission.

"Renewable energy cannot meet the country's growing needs. The nuclear programme is a strategic option for Jordan and we will continue with our plans. It will provide the country with a long-term solution for our growing energy needs," said Mr Al Araj.



The JAEC reportedly has been unable to decide between the two options due to the similar features of the two Generation III technologies, technology transfer opportunities, proposed coolant solutions and the shared inability to easily adapt the technology to the country's preferred site near Mafraq. (some 40 km northeast of the capital.)

In this country with few natural resources and dubious environmental enforcement, the question of how to satisfy its growing appetite for energy, in a way that maximally protects the Kingdom and its people, cannot be reached without full democratic participation.

Legal Committee Mahmoud Kharabsheh from the house of Parliament in Jordan confronted the ventures estimated cost, adding the expected costs could easily cost about \$20 billion and overburden the already cash-strapped national treasury.

Kharabsheh also questioned the feasibility and safety of the project, saying it would jeopardize the country's environment.

Toukan defended the controversial project retorting, "The third generation nuclear reactor to be built in Jordan is one of the most developed reactors and will be completely safe," Toukan said.

"Besides, the generation of electricity by using nuclear energy will be economically feasible."

Toukan also defended assigning the exploration and exploitation of local uranium ores to the French group AREVA, saying the firm is an arm of the French government and can be trusted to do the job.

AREVA was performing an exploration of uranium reserves in the central region, and had claimed the presence of up to 20,000 metric tons. The excavation of uranium by AREVA found that Jordanian Uranium is NOT as commercially viable as they had originally fantasized, and have in recent reports claimed that uranium markets will take years to recover from the Fukushima disaster; subsequently stopped its work, and sent back the large majority of its employees to France.

To date, Jordan Atomic Energy Commission has refused to recognize the implications of AREVA's findings, and instead has alluded to varying amounts of uranium supply, but did not comment on the potential inability for commercial use, which may be observed as a manner of attempting to keep the media focused nuclear build.

"Russia France and Japan competing to building nuclear plant in one of world's driest countries", 01/04/2012, online at: <u>http://enformable.com/2012/05/russia-france-and-japan-competing-to-building-nuclear-plant-in-one-of-worlds-driest-countries/</u>

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Desalination program treading water

State Comptroller's Report for 2012 criticizes government, officials for delays, irregularities in implementation of water desalination program

The <u>State Comptroller's Report</u> for 2012 which was released on Tuesday revealed that delays in the erection of <u>desalination</u> plants are continuing. The report's severe criticism of the desalination efforts is a continuation of the comptroller's criticism in previous reports.

The government, notes State Comptroller Micha Lindenstrauss, committed to establishing desalination plants that would by 2013, produce 600 million cubic meters of water per year. Yet so far the plants have only managed to produce 300 million cubic meters. "This is an ongoing governmental failure that impedes the public interest," the report determined.

"The Finance and Infrastructure Ministries and the Water Authority together with Mekorot, the national water company, have not done enough to ensure that the required amounts of water be desalinized for the earliest possible need," the comptroller added.

"We take seriously the fact that in spite of previous criticism from a national commission of inquiry, insufficient steps have been taken (on the matter).

"This is an essential and existential product where failure to address (the issue) in a timely matter could cause massive direct and indirect damages to the economy, the environment and the State's populace."

The comptroller also criticized the facility construction tenders. "One private entrepreneur is a partner in three out of five of the desalination plants...70% of the water set to be desalinized in Israel.

The entrepreneur (in question) is also the owner of a gas supply company (Delek) and power stations that provide energy for the desalination plants. Creating concerns for a possible unwanted monopoly and the expansion of centralization in the market."



WATER RESEARCH PROGRAMME -Weekly Bulletin-

The comptroller further notes that "the private entrepreneur holds a major stake in the market which creates a situation whereby the State is dependent and raises concerns of cross subsidization between his companies and the influence on prices."

The Anti-Trust Authority said in response that the ownership does not raise concerns of possible impa

"Desalination program treading water", 04/05/2012, online at: <u>http://www.ynetnews.com/articles/0,7340,L-4224047,00.html</u>

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***** Farmers walled in by irrigation costs

Ramallah: Palestinian farmers with land behind the Israeli separation wall are being forced to abandon them due to the backbreaking cost of irrigating their farms using water wells.

The discrepancy in costs is astounding. To irrigate their land, Palestinian farmers on the other side of the wall have to pay 130 shekels (Dh126) per cubic metre while farmers with land within the wall have to pay 40 shekels (Dh38) per cubic metre. Colonists living illegally in the West Bank have to pay only 20 shekels (Dh19) per cubic metre to irrigate their land.

Palestinian farmers expect the cost to increase further given the rising price of diesel. They have long endured the economic pain of holding on to their land behind the separation wall, but are now being forced to accept that their patriotism cannot make up for their huge financial losses.

"Palestinian farmers have risen to their patriotic duty of holding on to their land despite unfair and racist Israeli restrictions, but now the cost of irrigating their land is far too high for anyone to bear," Esmat Abu Khader, a Palestinian farmer, told Gulf News.

In jeopardy

"Agriculture behind the wall is in real jeopardy and soon the land will be abandoned and left to the Israelis," he added.

Abu Khader said the farmers have asked the Palestinian National Authority to provide them with electricity to pump water from their wells, but their requests have fallen on deaf ears.

Some farmers have set up a committee to solicit donors from other countries. "Donations will allow us to make necessary adjustments to the wells so that they are not dependent on Israeli energy. This will reduce expenses for us," Medhat Zaid, another farmer said.

While the farmers are losing money by cultivating their land, they have also had lucrative offers to work on Israeli land. Farmers are confused as to why the Palestinian National Authority has not stepped in to solve the problem, when doing so will benefit the government.

"It does not make any sense. We started to believe in conspiracy theories after this," Zaid said. "The Palestinian National Authority is sending mixed signals to its people. On the one hand it encourages non-violent resistance, but on the other hand it is allowing blatant Israeli exploitation of the very resistance it claims to champion."

Official response

Gulf News contacted the Palestinian Ministry of Agriculture, the municipalities of Nablus, Tulkarem, Qalqilia, and Jenin on the subject of irrigation. Officials confirmed that they were aware of the demands of the Palestinian farmers behind the barrier.



The municipalities said they were waiting for instructions from the ministry which in turn has referred the issue to the Palestinian government.

Municipality officials told Gulf News that the project to supply electricity can be ready in a short time, but so far there have been no instructions to start the work.

The officials say they receive daily complaints from farmers, the backbone of the Palestinian struggle against the Israeli barrier, adding that they have forwarded official reports on the deteriorating conditions.

The Palestinian authorities have been threatened by Israel on the issue and perhaps that is why their hands are tied, officials said.

"Farmers walled in by irrigation costs", 05/05/2012, online at: <u>http://gulfnews.com/news/region/palestinian-territories/farmers-walled-in-by-irrigation-costs-1.1018205</u>

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✤ Israel To Help India Clean Up The Ganges River

Young Israeli tourists are so common in <u>India</u> that in certain regions, restaurants hang signs and write menus in Hebrew. But Israel is now in the process of sending more than just tourists to the region. At the end of April, Israeli news site <u>Ynet reported</u> that Israel would be sending engineers, researchers and representatives from water technologies companies to help India clean up the notoriously-polluted Ganges River.

The river has become an increasingly problematic site for India as it has caused the spread of infections and diseases. Since February, the Indian government has been gearing up a campaign to clean up the river, promoting its importance as a religious site and also as a freshwater resource.

As Israeli experts fly overseas, Indian researchers and water tech company representatives, including members of the government-formed India Institute of Technology (IIT), will fly to Israel to learn about sewage treatment, water purification, <u>desalination</u> and water resource management from Israeli companies that work in the field and the Israel Water Authority.

The goal is that the Indian experts will be able to return home and incorporate some of what they learn into the Ganges River project.

Israel has been building <u>business partnerships</u> with India and China over the last few years and this January, Prime Minister Benajmin Netanyahu announced a plan to build two new railways linking the country's two seas, <u>the Mediterranean</u> and the Red Sea in the south. The 220 mile passenger train between Tel Aviv and <u>Eilat</u> would also ease China's and India's ability to trade across the Middle East and to Europe.

Cooperation between Israel and India has also had more colorful iterations. Over a year ago, Israeli industrial engineer Noa Lerner was struck by the problem of untreated sewage in slums and <u>designed</u> a <u>mobile public toilet</u> to ease the problem.

But with water being a <u>central environmental challenge</u> facing Israel, as well as <u>many other Middle</u> <u>Eastern countries</u>, the small desert country was a perfect destination for India to seek help. In fact, for Israel's official 64th Independence Day celebration on April 26, the government-designed ceremony was themed around water, honoring twelve leading experts from various water-related fields in Israel.

"Israel is considered a world leader in water technologies, and is well prepared to offer various solutions to the Indian government in this matter," Oded Distal, Manager of the unit to promote investments in the Ministry of Industry, Trade and Labor told Ynet.

"Israel To Help India Clean Up The Ganges River", 05/05/2012, online at: <u>http://www.greenprophet.com/2012/05/israel-india-ganges/</u>

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Egypt: Hope for Displaced Nubians

Half a century after losing their homeland to the Aswan dam, Egyptian Nubians look set to finally gain recognition and redress for their plight. Lower Nubia is modern Egypt's very own lost Atlantis. This ancient land today lies mostly under the waters of Lake Nasser, a massive reservoir created by the Aswan High Dam.

Now, half a century after the inundation, Egyptian Nubians are finally being offered the prospect of decent compensation for the loss of their homeland in the 1960s. Following years of concerted campaigning by Nubian campaigners, and their active role in the revolution, Fayza Abul Naga, the minister for planning and international co-operation, announced that Nubians would soon be compensated with new farmland and villages.

Ever since Egypt's controversial decision, taken soon after the 1952 revolution, to construct the High Dam, questions have persisted as to why Cairo was so cavalier with both the Nubian people and the priceless archaeology in which the region abounded.

Defenders and apologists insist that Nubia had to be dammed so that Egypt, one of the driest places on the planet and almost wholly dependent on the Nile for its water, would not be dammed.

And despite its severe environmental impacts, which were foreseen long before its construction, the dam saved Egypt, in the 1980s, from the severe drought upstream in Ethiopia, where most of Egypt's water originates. It has also played a major role in the modernisation, electrification and industrialisation of the country.

It has also been suggested that racism played a role too. However, I am not convinced that racial discrimination was a conscious factor in the decision to flood Nubia. As far as I understand it, the Nile had only one cataract in Egypt and this happened to lie near the ancestral lands of the Nubians.

Then, there is the question of regionalism and class. Egypt has long been run centrally from Cairo and the urban centres of the north, while the south, in general, has had little say in its own or the country's future. That would explain why Upper Egyptian peasants were also uprooted by the dam. The sacredness of "national unity" has also played a role, with Nubia's distinct culture and language often seen as a threat by the Cairo elites.

In addition, as elsewhere in the developing world at the time, development and modernity were a far more pressing imperative in the minds of Egypt's central planners of the time than cultural preservation and tradition. That helps explain why the Egyptian government had not given much thought to the preservation of the unique archaeological heritage of the region.

The international community managed, under the auspices of Unesco, to pull off perhaps the largest and most impressive archaeological rescue operation in human history which rehoused Nubia's most significant monuments, such as the temple of Abu Simbel.



The Nubians themselves were not as fortunate, and no massive international aid was forthcoming to help them relocate. Some 50,000 Egyptian Nubians were forced to move from 45 villages and relocated to Aswan, which has become a New Nubia.

Though New Nubia was supposed to mirror old Nubia, preserving its culture while introducing modern utilities, it was in reality a charmless development of small concrete housing which, unlike the lush Nubia they left behind, lay in the desert.

Dissatisfied with their new homes, a large proportion the inhabitants of New Nubia migrated to other parts of Egypt, though many dreamed of returning as near as possible to their ancestral homeland.

The reality of discrimination is reflected in the marginalisation that Nubians still endure. For instance, a disproportionate number of Nubians are employed in menial work, such as bawabs (janitors). In fact, in some parts of downtown Cairo, a cluster of poor Nubian communities exist on the rooftops.

Despite that, a few Nubians have made it to the very top of Egyptian society. Culturally, the Nubian singer Ahmed Mounib was the first to introduce mainstream Egypt to the mellow sounds of Nubia. His protege, Mohamed Mounir - himself a refugee from the Aswan dam - has managed not only to put Nubian music on the map, with his funky fusion of traditional Nubian with jazzy western sounds, but was also one of the very few mainstream artists to sing socially conscious lyrics before the revolution.

Interestingly, in spite of their general under representation, Nubians have fared markedly better in the highest echelons of Egyptian political life, perhaps due to the fact that the army has been one of the few routes open for the advancement of the marginalised.

The country's third president Anwar Sadat, although he grew up in the north of Egypt, was the son of Nubian parents, while the country's current de facto leader, Field Marshal Mohamed Hussein Tantawi, is also of Nubian origin.

In recent years, attitudes towards Nubians have been changing, and there is a growing recognition that the Nubian people were wronged. This process has gathered pace since the revolution erupted, and one can only hope that Nubians will be allowed to resettle in what's left of their homeland and be treated as full equals elsewhere in the country.

"Egypt: Hope for Displaced Nubians", 30/04/2012, online at: http://allafrica.com/stories/201205020034.html

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* A Kenyan Woman Stands Up Against Massive Dam Project

It wasn't until two years after construction began on the controversial Gibe III dam on the Omo River in Ethiopia that Ikal Angelei learned about the project. She soon realized, however, what the massive project would mean for hundreds of thousands of indigenous Ethiopians and Kenyans who rely on the waters of Lake Turkana, the world's largest permanent desert lake, which is located downstream.

While the Ethiopian government claims the Gibe III will provide badly needed electricity to one of Africa's poorest regions, Angelei, a 31-year-old Kenyan who grew up in the Lake Turkana Basin, says it would come at a steep price. The dam — which would be the world's fourth-largest — is expected to cause the lake's water level to drop by as much as 33 feet, a shift that would not only devastate fish stocks but trigger increased conflict in a region already troubled by violence over dwindling water resources.

Outraged that the massive dam project was being planned without any input from local communities — and without a comprehensive study into the long-term ecological and social costs — Angelei founded the <u>Friends of Lake Turkana</u> in 2009. In an interview with <u>Yale Environment 360</u> contributor Christina M. Russo, Angelei describes why the Gibe III project threatens the very survival of the region's indigenous tribes, what it will take it to stop it, and how she has used public pressure and social media to galvanize local and international opposition to the dam.

"If we let go and say, 'Build the dam,' it means we are saying that accountability doesn't account for anything in this world, and [that] governments can destroy environments and destroy ecosystems in the name of development," said Angelei, who this month received a <u>2012 Goldman Environmental Prize</u>.

Yale Environment 360: I wanted to ask you first about Lake Turkana. As the largest desert lake in the world, the area around it is quite harsh — and yet the lake appears to be very soft and beckoning.

Ikal Angelei: The region itself is very harsh. But when you go to the lake and you hear the waves, and you just see the moving of the water... it is unimaginable. In this very harsh area, you get this cold, nice water. It is just amazing. As you are driving — from the eastern shores or from the western shores — the lake is almost like a mirage. And as you come nearer and nearer, you just see a mass of water. For me, years later, despite being brought up there, that moment is still a magical feeling.

e360: <u>You've written</u> that, "more than a quarter million residents from at least ten tribes have become masters at wresting sustenance from the harsh landscape."

What communities live in the Lake Turkana area?

Angelei: The indigenous communities around the lake include Samburu, El Molo, Turkana, Rendille, Gabra and Dassanach — they are in Kenya. When you go into Ethiopia you have the Dassanach of Ethiopia, the Mursi, Nyangatom, Bodi, Hamar...

e360: Before the founding of <u>Friends of Lake Turkana</u> did the communities interact?



Angelei: Actually before the project they were isolated, but it was seasonally based. If you understand the conflicts around the region, we are in conflict about resources... The identity of the people is the lake. Even if you are trying to look geographically at where they are located, one will say "western shores" or "eastern shores" of the lake.

Economically, because of the changes in climate coupled with the harsh, extreme nature of the climate, people are looking at fishing — not to substitute but to complement pastoralism. So communities who are naturally

We really depend on groundwater, because we can't depend on the rainfall."

not fishermen are now going into fishing.

In terms of the water table in the region — it is a dry area. So we really depend on groundwater, because we can't depend on the rainfall... With the lake receding, the water table of the lake goes down. It dramatically affects the groundwater across the basin. So even people who are not naturally fishermen or directly depend on the lake, they depend on the groundwater for survival.

The very basic [threat] is that the ecosystem of the lake will change because of the dam project. If you have a reduced inflow from the river you will change the chemical balance of the lake. One, it is going to make the water more saline, so you cannot use it for human or animal consumption. The fish may not be able to sustain themselves in that water, because it becomes too acidic for them. And with the flow downstream of the Omo River, that's what determines the spawning and the breeding of fish.

e360: Why will the absence of the natural flooding process have such devastating affects on the communities?

Angelei: People always say, "Oh, we are controlling the flooding." But you cannot alter nature; you cannot fight nature... Lake Turkana doesn't have an outlet; it is a closed lake. So it depends on that balance of inflow versus evaporation. If you reduce that inflow, the level of evaporation increases. Once you have altered the balance of the lake, you have damaged the ecosystem completely.

They want to let the water flow in the minimum amount downstream. But that totally destroys the way people are living. When we leave the natural flow of the river, it spreads across into areas that are within the Turkana basin. That allows for pasture to grow where various communities are grazing. When you alter that, and water doesn't flood the region, then communities start to move to where these resources are available, which puts more pressure not only on the environment, it creates more conflict over the scarce resources that are available.

The same [threat] exists in Ethiopia — we cannot ignore that this is an area where communities are also struggling for resources. The communities live a way of life that is like a typical African three-legged stool. They depend on subsistence farming; they depend on fishing; and they depend on pastoralism. If you reduce the floods, it damages their subsistence farming, which is very key to their normal way of life... If you remove one leg, the stool really cannot balance.

e360: The dam construction began in 2006. But you didn't hear about it immediately. How did you



come to understand the project had begun?

Angelei: In late 2008, that is when I met [anthropologist] Richard Leakey. And while interacting with him and starting to work with him at

We knew that, for them, it was a matter of energy versus the life of people."

the <u>Turkana Basin Institute</u>, he came up to me one time and gave me a document that he had just received. The document indicated there was a dam being constructed, and a group of scientists and researchers had looked at what was said to be an Environmental Impact Assessment (EIA) that had just been released — and those scientists and researchers were questioning the facts [about the report].

e360: You had no idea about it until then?

Angelei: No idea about it. And Leakey said, "Yes, even I have just been informed about it." So I quickly started to talk to my members of parliament to find out if they knew about it. That is when we realized that neither the parliamentarians that represent the region nor the local communities knew about the project.

e360: Did you think this was intentional?

Angelei: We believed it was intentional. Later on, we read in the newspapers that some government officials knew about it. And that's when we knew that, for them, it was a matter of energy versus the life of people.

e360: How is Kenya supposed to benefit from this dam?

Angelei: The main reason behind the construction of the Gibe III dam is for hydroelectric power. But not for domestic use within Ethiopia. It's mainly for export to Kenya, Sudan, and Djibouti...

e360: After your discovery about the dam, you launched Friends of Lake Turkana.

Angelei: We officially formed the Friends of Lake Turkana in 2009 because we realized we needed to have a legal body. At first, the other citizens of Kenya — who had very little information about Lake Turkana — just thought we were making noise. Most of them were looking at it as, "We need energy;

You cannot say 'development' is telling people that your way of life doesn't work anymore." we are tired of blackouts." Which was reasonable. And we recognize the efforts of both the Kenyan and Ethiopian governments to source for energy development. But for us, it has always been: At what expense? And what alternatives do we have?

It seemed that originally more people did not know about the project than did. In Kenya, when there is a lot of hiding, we start to suspect something. So people started to question: Why is the government hiding something?

e360: So now what is Kenya's position on the project?



Angelei: It is quite divided. Half the ministers believe that this project should be stopped. The parliament has passed a motion asking the government to ask for a halt in the project unless a comprehensive and independent Environmental Impact Assessment is done — and an environmental social impact is undertaken. Not only on the dam but also the greater Omo basin.

But our president, our prime minister, and the minister of energy keep insisting that the project should go on. So, then we started to wonder what politics is being played here.

e360: If Kenya decided to halt support for it, would the project stop altogether?

Angelei: I don't think it could go on without Kenya's support because the viability of this project is based on Kenya's purchase [of electricity]. Ethiopia has already enough domestic energy — it has the Gibe I and Gibe II dams, which are sufficient for Ethiopia.

e360: Now the project has been criticized by your organization for not abiding by appropriate international and domestic protocol, including criticisms of the bidding process What has transpired that has made some major organizations back away from supporting the project?

Angelei: For a project this big that seeks international funding — which is basically taxpayer money from all these countries — you have to go through an open, public bidding process. This project did not go through that.

Salini [the Italy-based contractor] approached Ethiopia — and the company was given a direct bid. So the fact is that one company was given a contract of such large magnitude, without advertising and without letting others bid for the project.

e360: You think of this project as a human rights abuse as well as an environmental abuse?

Angelei: Yes, I think it is a human rights abuse and an environmental abuse. You cannot say "development" is telling people that your way of life doesn't work anymore. People have to develop in the way they see fit. If I don't want to drive, it doesn't mean I'm not developed. It means I am living my life in the way I see fit, as long as I am able to achieve my spiritual and basic needs.

e360: Do you think all of Kenya wants to fight to protect Lake Turkana, or do you feel this battle is very isolated?

Angelei: A greater part of Kenya appreciates the importance of environments, and how people live. But there are always the ignorant few who you meet along with way — who for them, having the electricity to play their music, and having lights and not having blackouts is more of a priority than communities and the way of life.

e360: Are you getting more support since your campaign began?

Angelei: Yes. Most people just didn't understand what the issue was. But There's absolutely no way that dam can go on and the people in Turkana will survive."



with a lot of media coverage and a lot of open discussions and with a lot of information on the website and using <u>social media</u>, there is a lot more interest. And especially after a couple of raids in the region, where we lost about 124 people, Turkana especially... it brought a clear picture of conflict over resources and <u>conflict over water</u>.

e360: Who is mainly in conflict with each other in the area?

Angelei: There's conflict between the Turkana and Dassanach in Kenya, and the Turkana and the Dassanach across the border... People used to talk about traditional raids. It's no longer that. People are now well armed and it depends on who has more bullets than the other.

e360: Are the communities in the Lower Omo Valley facing similar issues as you are at Lake Turkana?

Angelei: More or less, they have similar issues. But I think they are more pressured now. They have more pressure on their resources because land is being grabbed for sugarcane plantations and cotton plantations.

e360: I read <u>a report by Survival International</u> that says Ethiopia plans to resettle tribes which "stand in the way" of development plans related to the Gibe III dam. Is this really happening?

Angelei: Yes it is happening. Communities are being forced out of their lands... The government of Ethiopia is coming into the region and forcing communities out, because they have vast land — that's what allows them to have these lives, to be pastoralists, fish, subsistence farming. So they are being pushed into something like concentration camps — where they are told they will be given education, schools, health care. And then their land is being taken and in turn given to international companies from India, Malaysia, and more developing countries to produce sugar cane, cotton, etc.

e360: What is the Friends of Lake Turkana's ultimate goal?

Angelei: For us, this campaign will set a precedent. If we let go and say, "Build the dam," it means we are saying that accountability doesn't account for anything in this world, and [that] governments can destroy environments and destroy ecosystems in the name of development.

So our big goal is to push for a comprehensive, independent environmental and social impact assessments of the entire basin, which would allow us to understand what opportunities we have; what challenges we have, how fragile this ecosystem is; and what sort of development can be done there. And it would allow the communities to be part of this discussion.

e360: To be clear: If this dam project continues, you feel very strongly that people are going to die.

Angelei: Definitely. It's water. The other day, in Turkana, they discovered oil. The only thing that the local people were saying is: Why can't you ever discover water?

There's absolutely no way that dam can go on and the people in Turkana will survive. If it's not directly, then they'll kill each other, one by one. People will be fighting every day because it is the



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only way of survival now. We have very scarce resources. We have very little water. So who will control the water? It will be the strongest person.

"A Kenyan Woman Stands Up Against Massive Dam Project",25/04/2012, online at: <u>http://e360.yale.edu/feature/kenyan_ikal_angelei_stands_up_to_ethiopia_gibe_iii_dam/2520/?utm_source=Circle+of+Blu</u> <u>e+WaterNews+%26+Alerts&utm_campaign=5ad114add7-RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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* Kenya: Tackling Nairobi's Water Shortages

Nairobi is experiencing a water crisis of the kind that lures environmentalists into fits of gloomy Malthusian prognostications on demand and supply.

For Nairobians, running taps and showers are almost luxuries of a past that they remember with nostalgia.

The water situation in Nairobi is a scourge on our national pride. It undermines the livability and attractiveness of the city. The nickname The Green City in the Sun now only invites sniggers.

Less than 50% of Nairobi's residents have direct access to piped water and only 40% have daily access to water. Only 22% of residents of the informal settlements, home to 60% of Nairobi's residents, have access to piped water. Furthermore, Nairobi is insanitary; only 40% of Nairobi residents have access to the city's water and sewerage network.

The bulk of water supply for Nairobi comes via an old pipeline network from Ndakaini in Thika, Sasumua in the upper ridges of the Aberdares, Kikuyu springs and Ruiru in Kiambu. These sources are insufficient. The current demand for water exceeds supply by about 377,000 cubic meters per day. The supply deficit is exacerbated because 40-60% of the water destined for Nairobi is unaccounted for or lost.

The government, with funding from the French Development Agency and the World Bank undertook a study to identify new water resources within a radius of 70km of the Nairobi. The report Feasibility Study and Master Plan for Developing New Water Sources for Nairobi and Satellite Towns recommends groundwater development, abstraction and diversion of three rivers to supply additional water to the Thika reservoir by 2017.

Sadly, these new water resources will add a paltry 203,040 cubic meters per day, raising the supply to 685,980 cubic meters per day in 2017, against a projected daily demand of 1 million cubic meters. Additional diversions, abstractions and inter-basin transfers are proposed between 2018 and 2030, but are unlikely to meet the projected conservative demand of 2.5 million cubic meters per day by 2030.

The solutions proposed in the feasibility study and master plan - increasing supply bulk volumes of potable water from outlying rural districts - were first developed and applied in Europe in the 19th century. Cutting and pasting solutions for Europe and North America from two centuries ago will not solve the problems of a dynamic Kenyan city.

Meeting urban water needs in the 21st century will require a paradigm shift. 19th century supply side solutions alone will not balance the ever-growing demand for water driven by rapid urbanization, shortage of surface and ground water due to climate change and competition from agriculture. Conventional approaches to urban water needs are unlikely to support sustainable communities and sustainable urban growth. The development of sustainable technologies and demand management measures are urgently needed.



Cities are hotspots of water consumption. But cities also have a huge potential to reduce their water footprint. Simple, low cost distributed innovations can deliver phenomenal reductions on urban water demand while creating new jobs in green plumbing and ecological engineering, improving environmental quality and creating exquisite habitat for urban flora and fauna.

We need an approach that would reduce demand for centralized potable water through water use efficiency, reuse, recycling and purification of domestic wastewater, roof catchment and the abundant urban storm runoff.

Use of flush toilets (at 10-13 liters per flush) consumes nearly 40% of domestic water. Mandating the installation and use of low flush toilet would reduce water use per flush by 50%. Vacuum toilets use 0.5 liters of water per flush to transport the same volumes of human waste. Besides delivering outstanding water use efficiency, a dedicated vacuum sewer network connecting hundreds of households of can generate biogas as produce fertilizer for agricultural use. Furthermore, ecological sanitation approaches, which promote dry sanitation by separating solid and liquid human waste, offer low cost, low-tech, non-polluting effective sanitation solutions for low-income urban households.

Greywater - wastewater generated from showers, baths, hand basins, laundries and kitchens - is relatively easy to reuse. With minimal treatment, in the form of physical filtering and settling, greywater can be reused for toilet flushing and gardening. An ecological engineering approach through the application of constructed wetlands and wastewater aquaculture can be used effectively to for the treatment and purifying of wastewater and contaminated roof and urban storm runoff.

Water quality cascading, an approach that aims to match water quality to water use, is an important demand managing measure. Diversion of grey water from hand washbasin, washing machine and showering to toilet flushing is an example of water quality cascading.

Overall, national policy and institutional resources must focus on providing a framework for an integrated understanding of the multiple approaches to sustainable urban water and promote distributed, rather than centralized than water and sanitation strategies. Such decentralized infrastructure will rationalize water supply and demand while enhancing service quality and accountability.

"Kenya: Tackling Nairobi's Water Shortages", 30/04/2012, online at: http://allafrica.com/stories/201205020066.html

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Battle against dams building up

While irregularities were surfacing in irrigation projects around Mumbai in early April, the Forest Advisory Committee (FAC) of the Ministry of Environment and Forests (MoEF) rejected forest clearance to the Kalu dam in Murbad taluka of Thane district, which would have submerged around 1,000 hectares of forest land.

Work started last October without permission from the MOEF, and Indavi Tulpule of the Shramik Mukti Sanghatana said hundreds of trees were chopped, in blatant violation of the Forest Conservation Act. The dam didn't have approvals from the MoEF, there was no Environmental Impact Assessment (EIA), or rehabilitation and resettlement plan, or a public consultation, according to a statement from the South Asia Network on Dams, Rivers and People (SANDRP) and the Sanghatana, both of which have been raising this issue.

Public interest litigation

It isn't Kalu alone that is fraught with irregularities. In the case of the Kondhane dam in Karjat, similar violations have been raised in a public interest litigation in the Bombay High Court, filed by Anjali Damania of India Against Corruption (IAC) and some other groups, which is coming up for hearing on May 11. Kalu is just one of the 15 or so dams coming up in the adjoining Thane and Raigad districts of Mumbai, aimed at increasing the drinking water provision in areas under the Mumbai Metropolitan Development Region Authority (MMRDA) and Navi Mumbai.

According to activists of the Shramik Mukti Sanghatana, 18 villages, with around 18,000 inhabitants, mostly tribals, would be displaced by the Kalu dam, financed by MMRDA. The FAC's rejection is based on the premise that there is 'no respect for the laws of the land,' according to a site inspection report in January by the Regional Chief Conservator of Forests.

After the Sanghatana filed a Public Interest Litigation in the Bombay High Court, the construction on the dam was stayed in March. According to SANDRP and the Sanghatana, when the Regional Chief Conservator of Forests, Central Zone, visited the dam site, he was shocked by the extent of destruction. In his report submitted to the MoEF, he said the project proponents had no respect for the laws of the land and 'took permissions from the MoEF for granted.' The statement said the Konkan Irrigation Development Corporation (KIDC) gave the work order to a contractor in May 2011, but submitted the proposal to the MoEF only in August 2011. In addition, KIDC grossly underestimated the number of trees to be felled, and the villages that would be affected. It didn't even consider those villages which were to be cut off by the dam.

Displacement of tribals

The FAC said "it has taken note of the complaints received regarding this dam, and also that the State government hasn't submitted any of the reports requested by the MoEF." SANDRP said there were multiple dams coming up in the ecologically-sensitive Western Ghats around Mumbai, and a punitive measure would set an example for the remaining dams coming up too. Most of these dams have no EIA, environmental clearance, public consultations, Social Impact Assessment, or independent



monitoring and scrutiny. They all displace tribals without their consent, or without any rehabilitation plans.

In March, tribals led by the Kashtakari Sanghatana took a morcha to the MMRDA offices in Bandra to oppose these dams, which were to supply water to the cities. Brian Lobo of the Sanghatana said the government must first create an efficient water distribution network, plug all leakages and misappropriation of water, and conduct a Water Audit for the entire MMRDA area. A recent report by the Paani Hakk Samiti and YUVA States that while 3,350 million litres of water is supplied to Mumbai daily, approximately 1,000 million litres is lost due to leakages, rusted pipes, or from pipes that have been sabotaged.

The Sanghatana opposed dams to provide water to the entire area falling under the MMRDA, including the Municipal areas of Mumbai, Thane, Kalyan-Dombivli, Ulhasnagar, New Mumbai, Vasai-Virar, Mira-Bhayandar, and called for immediate cancellation of the Kalu, Susari, Shai and Balganga dams.

For the past hundred years, dams, which have been constructed in the rural areas of Thane and Raigad districts to supply water to Mumbai, destroyed the lives and livelihoods of Adivasis and farmers, the Sanghatana said. It criticised the "skewed policies of the government, which displaced Adivasis while providing the mega-cities of Mumbai-Thane and its suburbs with an uninterrupted supply of water from these dams."

"Battle against dams building up", 06/05/2012, online at: http://www.thehindu.com/news/national/article3388388.ece

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Protecting fresh water resources

Recent findings of the Pakistan Council of Scientific and Industrial Research (PCSIR) that water of the Keenjhar Lake, situated in Thatta district in southern Sindh, have been highly contaminated with concentration of faecal matter is more than shocking. These findings are just tip of the iceberg of water bodies in the province that have been polluted due to unchecked dumping of untreated sewage, industrial and agriculture waste. Nevertheless, state of water qualities in other provinces is no different. Such similar reports have also poured in sporadically from Punjab, Balochistan, Kyber-Pakhtoonkhwa and Gilgit-Baltistan provinces. Let me not drift away from discussing sensitivity of the Kaeenjhar Lake's soaring contamination first. What has come as nauseating and as has been the case in past is that most of such analytical reports about rising pollution in the freshwater bodies anywhere in the country have failed to draw due attention of media except very few. It is perhaps so that the mainstream media is pre-occupied by covering political issues.

Whatsoever reasons the media managers have to justify their positions though, these very public issues demand serious attention to put those at the helm of affairs to work and that they do not deviate from delivering to the public services. The latest PCSIR shocking findings have come on the heal of an inquiry of the Sindh Environment Protection Agency (Sepa) initiated recently into the pollution case after serving a notice to Fauji Fertiliser Company running a windmill project in the area close to the Lake. The PCSIR officials say that they launched their study SEPA laboratory tests found high concentration of urea in the samples obtained from the Horilo drain feeding Keenjhar Lake, which caused massacre of the fish, besides other animals of the nearby areas. During recent visit to flood-hit areas in Southern Sindh districts, most of which rely on Keenjhar Lake for drinking water, farming and other purposes, the people and representatives of local NGOs and doctors at both government and private health facilities in these district complained that over last several years there has been steep rise in water-borne cases being reported from Thatta, Badin and other adjoining districts.

Similar complaints have been also echoed from country's biggest metropolis of Karachi, whose over 90 percent water needs are met from Keenjhar Lake. But authorities concerned and responsible for controlling pollution in the Lake and other water bodies of the Sindh province have been seen doing little to address the issue of mounting water contamination. Punjab Irrigation and Drainage Authority's official Nosheen Fazal told to an internal briefing last month that pollution of River Ravi has seriously affected the immediate areas surrounding the River and hundreds of miles away from it. Fatal diseases in human being and livestock are also being reported from the areas dependent on Ravi's water. Ravi has become a drain receiving not only the municipal and industrial waste



generated by the residential colonies and factories around its banks but also the industrial and agricultural discharges from India through the Hudiara drain.

The Pakistan Council of Research in Water Resources, which launched its National Water Quality Monitoring Program in 2001, documents the water quality analyses from areas of the country and submitted its fifth and final Report in 2007. The in-depth report analyses the water quality of 357 samples collected from 23 major cities, eight rivers, six dams, four lakes, two canals and one reservoir from across the country. According to report's findings, every major city has reported unsafe drinking water. None of the water sources tested and analysed in Hyderabad, Karachi, Sukkur, Quetta, Bahawalpur, Kasur, Multan, Lahore, Sheikhupura and Ziarat was safe for drinking purposes. All of the 22 surface water bodies evaluated in the report have been found to be contaminated with colioforms and E. Coli; 73 percent had a high level of turbidity, three had high concentrations of irons and 27 per cent showed excessive concentrations of iron and fluoride. Findings show that most surface water contamination is caused by untreated discharge of wastewater from urban areas. Appalling, estimated 2,000 million gallons of sewage disgorges into surface water bodies in Pakistan daily. The somber state of the country's water quality is an environmental disaster too. Untreated sewage discharge, industrial effluent and agricultural run-off are poisoning our water in particular and ruining health of people in general. The water experts say The main problem of water in Pakistan is the poor water efficiency on the supply side as well as high consumption in all sectors. The shift from a supply driven approach to a demand management approach has not yet been realised. Moreover, industrial effluent under law direly needs to be regulated by environment protection agencies through self-monitoring and reporting programmes under the Environment Protection Act of Pakistan.

Contamination of water resources of the country can ben checked if stringent policy and legal measures backed by awareness-raising interventions are taken. Some of them are: polluting industrial units be identified and banned, regular qualitative and quantitative monitoring of fresh water resources be taken, proper sanitary landfill sites be built, government should engaged with managements of industries for efficient waste management and its proper disposal and, last but not least, awareness-raising programmes should be launched at all levels to bring about change in public perception towards depleting freshwater resources and motivate them to play their part in saving the water resources from being tainted anymore.

"Protecting fresh water resources", Saleem Shaikh, 06/05/2012, online at: <u>http://pakobserver.net/detailnews.asp?id=153886</u>

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Sod-awful pollution of India's waters

Scientists in India, concerned about pollution, have been assessing the effects of immersing painted idols in water during religious ceremonies

Do the gods pollute? Scientists in <u>India</u>, worried about the public health consequences of immersing idols in lakes and rivers, have been looking anew at <u>water pollution</u>. They hope, and perhaps in some cases pray, to harmonise their medical concerns with some people's religious priorities.

Most of their <u>research</u> has focused on idols of the elephant-headed god Ganesh, created for the annual <u>Ganesh Chaturthi</u> celebration. Once a fairly quiet, mostly private practice, Ganesh Chaturthi now involves large, public festivals in many parts of the country. Researchers have also looked, a little, at the effects of immersing other idols, especially those of the many-armed goddess Durga.

<u>One of the latest studies</u> is called Assessment of the Effects of Municipal Sewage, Immersed Idols and Boating on the Heavy Metal and Other Elemental Pollution of Surface Water of the Eutrophic Hussainsagar Lake (Hyderabad, India). A team sampled water repeatedly from different parts of the lake, including one spot "immersed with hundreds of multicoloured idols of Lord Ganesh and Goddess Durga", and another near "the outfall of black-coloured, untreated raw sewage containing a collection of industrial effluents". Sewage, they conclude, accounts for most but not all of the pollution. High levels of zinc, calcium and strontium "were probably due to the immersed idols painted with multicolours".

Some studies concentrate on isolating the effects of idols from those of other sources. <u>Impact of</u> <u>Ganesh Idol</u> Immersion Activities on the Water Quality of Tapi River, Surat (Gujarat, India) tells of sampling the water "at morning hours during pre-immersion, during immersion and post-immersion periods of Ganesh idols". The conclusion: the "main reason of the deterioration of water quality ... is various religious activities", with special blame given to "the plaster of paris, clothes, iron rods, chemical colours, varnish and paints used for making the idols".

Several studies examined a lake in the city that suffered India's most famous act of pollution: the 1984 <u>chemical leak from a Union Carbide</u> factory, which resulted in several thousand deaths.

<u>Heavy Metal Contamination</u> Cause of Idol Immersion Activities in Urban Lake Bhopal, India, published in 2007, finds that idol immersion has become "a major source of contamination and sedimentation to the lake water". It warns that idol-derived heavy metals, especially nickel, lead and mercury, are likely to find their way into "fishes and birds inhabiting the lake, which finally reach the humans through food". The authors want to "educate idol makers" to make their idols small, of non-baked, quick-dissolving clay, and with "natural colours used in food products".

"God-awful pollution of India's waters", 30/04/2012, online at: <u>http://www.guardian.co.uk/education/2012/apr/30/improbable-research-indian-water-</u> <u>pollution?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=15f1708161-</u> <u>RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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Dryness Threatens India Cane Crop

MUMBAI – A shortage of water has stunted the growth of sugarcane in Maharashtra and sugar output from the state, India's largest producer of the sweetener, could drop unless it receives adequate rains during the June-September monsoon season, industry executives said Monday.

Sugarcane is a long-duration crop and needs a lot of water. Farmers in Maharashtra planted the crop between June and July 2011 and now it is in its growth stage. Its harvesting will start in October.

Inadequate rains toward the end of the last monsoon and lower pre-monsoon showers this year have created a water shortage for the crop during the critical growth period, potentially affecting its yield and sucrose content.

Rains in Maharashtra between March 1 and April 25 were 59% below the level considered normal, according to the India Meteorological Department.

"There could be a 10% fall in overall production [in Maharashtra] next season, if the water shortage continues," said Ajit Chougule, managing director of Maharashtra State Co-op Sugar Factories Federation Ltd.

Sugar production in Maharashtra is estimated to be about nine million metric tons in the current marketing year, which ends on Sept. 30.

Lower production in Maharashtra, which accounts for one-third of India's output, may affect the country's overall sugar production in 2012-13. The expectation of a decline in output may also limit the scope of more sugar exports next marketing year.

The country has allowed about three million tons of sugar exports in 2011-12 and mills are demanding to allow another one million tons.

The monsoon season is critical for the cane yield and if the water availability remains inadequate, Maharashtra's cane production may decline even beyond 10%, said a senior executive at a large sugar mill in the state.

The weather department said last week that the possibility of El Nino -- a weather condition associated with below-normal rains -- can't be ruled out in the latter part of this year's monsoon season.

If there is enough rainfall during the season, yields may improve, limiting the damage, added B.B. Thombare, chairman of Natural Sugar & Allied Industries Ltd., a sugar mill based in Maharashtra.

"Dryness Threatens India Cane Crop", 30/04/2012, online at: http://online.wsj.com/article/SB10001424052702304050304577375711791042708.html?mod=googlenews_wsj&utm_so urce=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=0ddf3e4583-RSS_EMAIL_CAMPAIGN&utm_medium=email



Solve water problems or forget growth, India told

(Reuters) - India's economic growth and political stability are at stake in coming years if it does not change its approach to water management, a member of its natural resources planning commission told Reuters on Monday.

Mihir Shah, who has been asked by India's government to come up with a new water resource strategy, said the sector needed to become more sustainable, efficient and focused on how water is used and how it reaches people.

"If this is not attended to, India's growth story will completely go off the rails," Shah said during an interview at the Global Water Summit 2012 conference in Rome.

"There will be water conflicts, conflicts between users, across regions, they will become very serious and a threat to the democratic fabric itself," he said, adding that neighboring <u>Pakistan</u> and Bangladesh faced similar challenges.

Water limits are close to being breached in several countries, while food output has to increase by up to 100 percent by 2050 to sustain a growing world population, according to the United Nations.

India's economy is seen growing about 7 percent in 2012 and 2013, down from the 8.4 percent levels of the last two years, the International Monetary Fund (IMF) said this month.

It is one of the world's fastest growing economies, but development is uneven and millions still live in poverty in rural areas and urban slums with limited access to clean water and sanitation facilities.

The World Bank says key problems in India's water sector include data secrecy, competition for resources, too much focus on increasing supply and not enough on management.

Shah said India had reached a plateau in terms of water resource exploitation, with few options for the construction of new dams, and ground water also depleting.

"We can't expand in a quantitative sense so we have to expand by using our water more carefully," he said.

His plans include improving data collection on the location and types of water resources, promoting water-saving farming technologies, developing sewage treatment facilities alongside water projects, and establishing a national monitoring body and a new legal framework for the sector.

"The overexploitation of aquifers has gone beyond anything imaginable and we need a new ground water law," he said, adding that it would discourage water use deemed detrimental to the public interest.

The proposals are part of a five-year plan but he expected it would take up to 20 years for the changes to become fully entrenched.



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Shah said the reform of the sector presented many opportunities for private investors, particularly in new irrigation technology and in urban sewage projects to meet the needs of expanding populations in small towns.

"Solve water problems or forget growth, India told", 30/04/2012, online at: <u>http://www.reuters.com/article/2012/04/30/us-india-water-</u> <u>idUSBRE83T0QV20120430?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=0ddf3e4583-</u> <u>RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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* Kashmir Water Dispute

FRED DE SAM LAZARO, correspondent: Kashmir has long been known for its peaceful vistas but for the 13 million inhabitants this mountainous region has been anything but peaceful. It is one of the world's most militarized places. India alone has an estimated 600,000 troops in the part it controls, four times the number of American soldiers who were in Iraq at the height of that war. Although it has a two-thirds Muslim majority, Kashmir as a whole is quite diverse, the southern region mostly Hindu, the northeast Buddhist. But for six decades this province with a land mass the size of Idaho has been bitterly fought over by India and Pakistan.

It all dates back to 1947, when the departing British decided to partition the newly independent India. Muslim majority areas were to form the new republic of Pakistan. But Kashmir had a Hindu ruler, and he opted under pressure to join India. That set off the first of three major wars between India and Pakistan, ending in a ceasefire with India controlling about two-thirds of Kashmir, Pakistan most of the rest. The so-called "line of control" that divided Kashmir has served as an international border for 65 years, but Kashmir has festered as a sore point between the Islamic republic of Pakistan and mostly Hindu India.

Although the conflict has long been cast in religious terms, Joseph Schwartzberg, a leading scholar on Kashmir, says it's more complicated than that. And within Kashmir, he says, there's a long tradition of tolerance.

PROFESSOR JOSEPH SCHWARTZBERG: The Hindus frequently attended religious ceremonies that were held by Muslims, and the converse was also true. In terms of actual day to day religious practices it was a fairly eclectic area, and the type of strident militaristic Islam that we think of when we think of, say, the Middle East—that was not present in Kashmir at all.

DE SAM LAZARO: That began to change in the 1980s in Indian-held Kashmir with more religious tension and extremism. Schwartzberg blames corruption, non-functioning local government, and meddling from India's capital Delhi in local elections.

SCHWARTZBERG: India is a pretty good functioning democracy in most parts of the country, but with respect to Kashmir it was exceptional. They felt that they couldn't afford to lose elections. They managed to rig election after election, and the people simply got fed up. In 1987—and it was a pretty corrupt administration, so the people just had it— they initiated a series of demonstrations which were put down with a heavy hand, and in 1989 it really got out of hand, and the Indian government moved in in force.

DE SAM LAZARO: The clampdown triggered a militant separatist insurgency—or vice versa, depending on who is telling the story. India has blamed Pakistan, especially its intelligence service, and Islamist extremist groups. Pakistan says it offers only moral support for the insurgents. Groups like Human Rights Watch blame militant groups, but they also finger Indian security forces for widespread abuses under the guise of rooting out militants. India insists that most are infiltrators from Pakistan-held regions and beyond. Tens of thousands of civilians have died or gone missing. Kashmir's grand mufti, the top religious leader recognized by India's government, also blames both sides for excesses, and his numbers are much higher.



BASHIR UDDIN AHMAD (Grand Mufti): Since 1989, when the situation became more critical, hundreds of thousands of people are missing and hundreds of thousands more have been killed. We have no knowledge of where they are. The killing continues unabated, and the situation is still simmering.

DE SAM LAZARO: In recent years, the Kashmir dispute has taken on a new dimension as India has announced plans to build several dams, seeking hydro-electric power for its fast-growing economy. But Kashmir's rivers also irrigate the breadbaskets of both India and Pakistan. So far there have been no problems sharing the waters under an internationally brokered treaty in 1960. However, Pakistan says the Indian dams could affect seasonal water flows to its farmland.

KAMAL MAJIDULLA (Pakistan Presidential Advisor): It's devastating, because if the waters are not available to me in the quantities that I need them at the time that I need them, then I'm looking at a very low productivity of my agricultural sector.

DE SAM LAZARO: Pakistan has taken its protest to arbitration provided for under the Indus water treaty. India insists it is in full compliance. However, the fact that India, being upstream, could in theory manipulate flows could be politically toxic, particularly after the severe floods Pakistan has endured in recent years.

Hafiz Saeed is a man the US government has branded a terrorist and for whose capture it has offered a \$10 million bounty. Saeed has blamed India for worsening the flooding. Pakistani presidential advisor Kamal Majidulla says such rhetoric resonates among farmers who are hurting.

MAJIDULLA: The farming community, which otherwise could look after their children, are unable to do, so the children have been going off and staying in madrassas instead of going to the local school system, because the madrassas feed them. I'm not saying all madrassas are bad. They do perform a social function, and some of them perform a very good social function, but a fair number of them are not. And this is where the cannon fodder comes from. So there is a direct linkage between water availability, low agricultural productivity, and the rise of terrorism.

DE SAM LAZARO: Officials in India's capital Delhi say the Pakistani fears of water treaty violations are overblown. Ashok Jaitly, a scholar at a Delhi-based think tank, says the bigger threat is poor conservation and water mismanagement on both sides.

ASHOK JAITLY (Energy Resource Institute): If you had a cooperation based on good scientific river basin management of the Indus basin, and that's where the Indus water treaty does not provide for it, it only provides for sharing of water. It does not provide for scientific integrated river basin management. If you could have that, then I think a lot, I won't say all the problems would be solved, but a lot of the problems between India and Pakistan would be resolved, or could be resolved.

DE SAM LAZARO: Back in Kashmir, long squeezed as its two nuclear armed neighbors fight over it, Mufti Bashar Uddin says growing numbers want no part of either.

MUFTI UDDIN: As a religious leader, I would tell the people that if the option of independence is offered, that would be the best bet for Kashmir.



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DE SAM LAZARO: That seems highly unlikely—both India and Pakistan reject the idea. So, to most analysts, does any quick resolution of the Kashmir stalemate. In recent months, there's been a thaw in relations between India and Pakistan, with proposals to vastly increase the amount of trade across the border. Coincidence or not, Kashmir has enjoyed one of its quietest periods in years. The natural beauty is once again luring tourists. In 2011, more than one million visitors came here, most of them Indian. It remains to be seen whether and how much more tourism and commerce can repair 65 years of suspicion and upheaval.

"Kashmir Water Dispute", 04/05/2012, online at: <u>http://www.pbs.org/wnet/religionandethics/episodes/may-4-2012/kashmir-water-dispute/10904/</u>

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* Per Capita Water Availability Declines In India

NEW DELHI, April 30 (Bernama) -- Per capita availability of water in the country has declined to one-third in the past 65 years, Water Resources Minister Pawan Kumar Bansal told the Rajya Sabha (Upper House of Parliament) on Monday.

Enough water was still available if the scarce natural resource was used judiciously. 65 years back water available per capita has reduced to one-third," he said. "A national water policy is on the anvil. I will soon announce that," Press Trust of India (PTI) quoted him as saying during question hour.

Bansal added that he felt Rajasthan was not getting its share of Yamuna water.

Water being a state subject, the role of the Centre is of a facilitator in inter-state water disputes, he said urging state governments to quickly arrive at mutually agreeable solutions.

The Upper Yamuna River Board (UYRB) has identified the possible reasons as losses in the carrier system and unauthorised lifting of water by farmers in Haryana.

UYRB has advised Haryana and Uttar Pradesh from time to time to release the full quantum of Rajasthan's share of Yamuna water at Okhla and to stop the unauthorised lifting of water, he said.

"Haryana has informed the UYRB that all the pumps drawing water illegally have been shut down, all pipes have been removed and special Police Stations have also been established to stop unauthorised lifting of water," he said.

As the carrying capacity of existing carrier system was inadequate, Rajasthan had submitted a proposal for construction of new canals and structures along with modernisation and extension of existing canal system.

"Per Capita Water Availability Declines In India", 30/04/2012, online at: <u>http://www.bernama.com/bernama/v6/newsworld.php?id=662919</u>

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* APC joins global call against Tipaimukh dam

Imphal, May 03 2012: The Philippines based Asian Peasant Coalition (APC) has joined the global call to revoke plans to build Tipaimukh dam in Borak River East India.

"We denounce the Government of India for pushing the construction of the proposed 1500 MW Tipaimukh Multipurpose Hydroelectric Project (HEP) across Barak River in Manipur and within 100km of Bangladesh border.

All of the five public hearings on the project held between 2004 and 2008 have ignored the voices of the indigenous Hmar and Zeliangrong communities violating their right to participate in the decision-making processes and the right to their Free, Prior and Informed Consent (FPIC)," remarked Fathima Burnad, APC Chairperson and concurrent leader of the Tamil Nadu Women's Forum (TNWF).

"The construction of the dam when completed would bring about a major disaster for Bangladesh, virtually drying up the Surma and the Kushiara Rivers in winter season, which water most of the North-Eastern regions of Bangladesh.

The dam would hit the people badly," according to Badrul Alam, APC Vice-chairperson for External Affairs and President of the Bangladesh Krishok Federation (BKF).

Burnad stressed that, "A large number of Zeliangrong and Hmar people in India will be displaced permanently with the submergence of about 311 sq.

KM covering 90 villages, affecting an area of nearly 2000 sq.

KM" .

Both leaders said, "The project has put at stake the rights of the affected communities to their lands, territories and resources, including their livelihood, traditional knowledge, cultural values and identity".

Both leaders added that, "the construction work of the Tipaimukh Dam was postponed in March 2007 due to protests from different parts of Bangladesh and India.

We can do it again! Let us intensify our action against the construction of Tipaimukh Dam" .

The APC calls on the Government of India and the Government of Manipur to revoke the Memorandum of Understanding (MoU) signed between the Government of Manipur in India and National Hydroelectric Power Corporation (NHPC) and Satluj Jal Vidyut Nigam Limited (SJVNL); fully adhere to the recommendations of the World Commission of Dams and UNDRIP - particularly



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regarding FPIC - before proceeding with the dam; conduct holistic Impact Assessment, such as on the socio-economic, environmental, cultural, health and human rights impacts due to the proposed Tipaimukh Dam, oil and petroleum exploration in the Barak River Basin in Manipur, Mizoram, Assam and Bangladesh with due participation of all affected peoples; and stop all forms of development aggressions and militarization, according to a statement issued by APC Secretariat.

"APC joins global call against Tipaimukh dam", 03/05/2012, online at: <u>http://e-pao.net/GP.asp?src=21..040512.may12</u>

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* 'EU banks commit to finance construction of Munda Dam'

ISLAMABAD: The European Union (EU) banks have committed to provide substantial financing for the construction of Munda Dam as experts have estimated the construction cost of the project at \$1.4 billion, an official said on Friday.

"Yes, the EU banks have made a commitment with us to become part of the financing arrangement for the construction of Munda Dam," Shakil Durrani, chairman of the Water and Power Development Authority (WAPDA), told The News.

The feasibility study for the construction of Munda Dam was already completed that would help generate power of 740MW, he said, adding that for detailed engineering and design the foreign assistance of over \$11 million had already been committed by the donors.

The WAPDA chairman said that the foreign funding for water and power sector is not a problematic area, but they required concerted efforts to come up with the plans for construction of mega dams in a bid to shift mix of power generation in favour of the hydropower projects against the thermal power generation.

"We have made plans to bring major shift in the power mix by 2025 when hydropower generation will be standing at over 65 percent and thermal power generation will be minimised by around 35 percent," he added.

Regarding allocations for water and power sector in the outgoing fiscal year, Durrani said, WAPDA had sought Rs64 billion in 2011/12 and the government had allocated Rs20 billion for water sector in the outgoing fiscal year, of which it had so far released Rs10.5 billion. For the power sector, the demand stood at Rs42 billion, while the government has allocated Rs18 billion, of which Rs11.7 billion have so far been released.

WAPDA financed power sector projects from its own resources to the tune of Rs24.5 billion and Rs5.3 billion was received in the shape of foreign assistance, he added.

The work on Gomal Zam Dam is almost complete that would help store 0.892 million acres feet (MAF) water and would generate 17.4MW electricity, he said.

The Satpara Dam will generate 17.36MW and 0.053MAF water, he said, adding that the Rainee Canal and Kachhi canals will be constructed within the ongoing calendar year 2012 that will help irrigate 412,400 acres and 713,000 acres land, respectively.

For drainage projects, the WAPDA chairman said that RBOD-I and RBOD-III would be completed soon that would irrigate 542,500 acres and 287,106 acres of land, respectively.

Dwelling upon the hydropower projects under construction phase, Durrani said that Duber Khwar Kohistan, KPK would be completed by 2012 that would generate 130MW, while Allai Khwar located at Batagram would generate 121MW.



Jinnah hydropower project, he said, would also be completed within the ongoing calendar year that would help generate 96MW.

The Neelum-Jhelum hydropower project is going to be completed by 2016, while Golen Gol located in Chitral will be completed by 2015.

The two projects, which are at an advanced stage and ready for construction, is Diamer-Bhasha Dam that would generate 4,500MW and the water storage of 8.1MAF and second is Khuram Tangi Dam with an estimated cost of \$700 million that would generate 84MW, he added. The feasibility studies of four projects have been completed, while detailed engineering is in the process of finalisation that included Tarbela fourth extension project with a capacity of 1,400MW, Dasu project with a capacity of 4,320MW, Phandar project in Gilgit with a capacity of 80MW and Munda Dam with a capacity of 740MW, the WAPDA chairman said.

Two projects, including Bunji project with a capacity of 7,100MW and Keyal Khawar project with a capacity of 122MW where feasibility studies have been completed.

There are 14 projects in the pipeline with the planned capacity of 14,020MW, of which 12 have been expected to be built on run of river

^cEU banks commit to finance construction of Munda Dam', 05/05/2012, online at: <u>http://www.thenews.com.pk/Todays-News-3-106538-EU-banks-commit-to-finance-construction-of-Munda-Dam</u>

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Opening the floodgates

A giant dam is about to be built. Protests are about to erupt

WHAT looked like an admittedly temporary reprieve for the swift currents and extraordinary biodiversity of the Mekong river is now over. In December the Mekong River Commission (MRC), an intergovernmental body made up of Cambodia, Laos, Thailand and Vietnam, called again for approval of a potentially devastating dam at Xayaburi in northern Laos to be withheld until more is known about its effect on the lower Mekong. Apart from high up in the gorges of south-western China, the Mekong remains undammed. But now CH. Karnchang, a Thai construction giant contracted to build a \$3.8 billion dam at Xayaburi has told the Bangkok Stock Exchange that dam construction officially began on March 15th, and that 5,000 workers have just been hired.

The news has triggered an angry response from riparian neighbours. The December agreement, calling for further scientific study of the environmental impacts, included Laos. Opponents of the dam argue that the Xayaburi dam will cause immense harm to ecosystems and imperil 65m South-East Asians who rely on the Mekong, the world's biggest inland fishery, for their sustenance.

Cambodia's water-resources minister, Lim Kean Hor, sent a strong protest letter to Laos. He called for an immediate halt to construction until an independent assessment has been completed. Japan has just agreed to fund a study on Mekong dams, under the auspices of the MRC. Vietnam strongly backs Cambodia, and has repeatedly called for no more dams to be built on the Mekong for at least ten years. The Lao government's failure formally to notify its Mekong partners about the construction, allowing the dam to proceed under the radar, clearly undermines the credibility of the MRC's consultation processes. In truth, though the Mekong Agreement signed in 1995, which gave birth to the commission, requires the four nations to consult and respect neighbours' concerns, final decisions are left to each sovereign state.

A "Save the Mekong" campaign, chiefly among Thai non-government organisations (NGOs) has been gathering force. The NGOs complain of silence from the commission's head office, based in the Lao capital of Vientiane. The MRC appears incapable even of sending a monitoring team to the dam site.

Perhaps Cambodia will file a complaint against Laos in an international court. More likely, as Niwat Roykaew, chairman of the Chiang Khong Mekong Conservation Group, suggests, local residents might have no choice but to use sit-ins and other obstructions in order to shut down the Mekong "friendship bridges" between Thailand and Laos, should the MRC fail to compel Laos to suspend the dam construction.

"Opening the floodgates", 05/05/2012, online at: http://www.economist.com/node/21554253

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Plans for dams on Mekong River could spell disaster for area fisheries

A massive expansion of hydropower planned for the Mekong River Basin in Southeast Asia could have a catastrophic impact on the river's fishery and millions of people who depend on it, according to a new study by researchers including scientists from Princeton University.

The researchers analyzed a number of scenarios for dam construction along the river and its tributaries. In an <u>article</u> in The Proceedings of the National Academy of Sciences (PNAS,) they found that, in the most extreme cases, about a quarter of the migratory fish in the Lower Mekong Basin could be lost.

The researchers warned that ecological damage is not the only concern. The Mekong River Basin, home to 65 million people, is the world's largest inland fishery, with about two-thirds of the residents depending on subsistence fishing for their diet.

Guy Ziv, the paper's lead author and a former Princeton researcher, said the importance of the river as a food source makes the impact of development "a major food security concern."

The construction is being driven by the increasing power needs of the expanding economies of Southeast Asia. Dams constructed in Laos would provide power not only for that country, but also for Thailand and Vietnam, as currently planned.

The researchers recognized the importance of the power to the region, and that hydropower offers many advantages over other power sources such as fossil fuels. But they said governments in the region should carefully consider the tradeoffs before continuing with the dam projects.

"Large rivers of the world are fundamentally important ecosystems," said <u>Ignacio Rodriguez-Iturbe</u>, the James S. McDonnell Distinguished University Professor of <u>Civil and Environmental Engineering</u> at Princeton and one of the authors. "Frequently, the urgent need for hydropower generation leads to a neglect of crucially important considerations like biodiversity and fish resources when planning the construction of dams along the rivers."

The PNAS report offers an opportunity to consider these tradeoffs as well as a set of possible solutions that the researchers said would minimize the impact on the river's fish for different levels of energy production.

"We are not saying you should not build dams," Ziv said. "We are saying that you should build to minimize the impact."

Ziv is a research scientist at Stanford University who wrote the paper while working at Princeton. His coauthors are <u>Simon Levin</u> of the Department of <u>Ecology and Evolutionary Biology</u> at Princeton; Rodriguez-Iturbe of the <u>School of Engineering and Applied Science</u> at Princeton; Eric Baran of the WorldFish Center in Phnom Penh, Cambodia; and So Nam of the Cambodian Fisheries Administration. The research was supported by the James S. McDonnell Foundation, the AXA Research Fund, Mitsui-Bussan and the government of Japan.

The Mekong River runs through Southeast Asia from the Tibetan plateau to the South China Sea. Geographers usually divide the river into the Upper and Lower Mekong, with the lower division beginning at the Chinese border and running to the Mekong Delta in Vietnam. The Mekong is one of the world's most diverse fish habitats, and many of its fish are migratory, so they are particularly vulnerable to habitat disruption. The



researchers identified 877 species of fish in the Lower Mekong Basin, including 103 migratory species, that would be affected by dam construction.

"The Mekong is one of the richest spots in the world," said Levin, the George M. Moffett Professor of Biology at Princeton. "It is a diversity hotspot."

Since 1995, development of the river has been overseen by the Mekong River Commission, an intergovernmental organization of some of the countries in the basin including Cambodia, Laos, Thailand and Vietnam. While the commission oversees construction of dams on the mainstream of the Mekong, member nations only have to provide notice before building dams on its tributaries.

The researchers analyzed a number of different scenarios. In particular, they studied current plans to build six dams on the Mekong and 27 dams on tributaries between 2015 and 2030. That construction would bring to 84 the total number of dams on those parts of the basin. Using mathematical models to estimate energy production and loss of fish, the researchers assessed the construction of the mainstream dams and those on the tributaries.

They concluded that the construction of the 27 tributary dams alone would result in the loss of about 20 percent of migratory fish biomass. Construction of six dams on the mainstream would result in a 7 percent loss of fish. But the researchers also concluded that the mainstream dams alone would produce nearly 50 percent more energy than the 27 tributary dams.

"I was surprised that the tributary dams would have more impact than the mainstream dams," Ziv said.

Many migratory species in the Mekong travel into the tributaries for shelter in the dry season or for spawning, he said. The dams on the tributaries — or lower down in the main river — block the fish's ability to travel. Although governments in other countries have protected fish in some rivers by building bypasses, called fish ladders, that alternative would be very difficult in the Mekong basin. Most fish ladders are built to accommodate one type of fish, such as trout or salmon, but the Mekong has such a wide variety of fish that it is not possible to build ladders to accommodate them all.

Ziv said that simply arguing that no dams should be built is not realistic, particularly in a region with poverty and high demand for energy.

"Hydropower is obviously very attractive as an energy source," Ziv said, adding that the purpose of the research was to allow leaders to make informed decisions with a realistic view of the projects' impacts.

Ziv said the researchers felt their report was a positive one overall. If the countries in the region can work together, they potentially could generate a large amount of energy without doing a tremendous amount of damage to the river, he said.

"You can reach a pretty large level of energy production without losing a lot of biomass," he said. "However, our results suggest that there are some dams that you can and should avoid."

"Plans for dams on Mekong River could spell disaster for area fisheries", 30/04/2012, online at: <u>http://www.princeton.edu/main/news/archive/S33/58/78C70/index.xml?section=topstories</u>

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Anti-dam activists picket Phuket meeting

PHUKET: Around 30 members of the Network of Thai People in eight Mekong Provinces (TPMP) travelled from the Thai northeast to Phuket to protest today (May 1) against the Xayaburi Dam, a major project to dam the giant river.

With the Mekong River Commission (MRC) holding an international conference on "transboundary river basin management" at the Mövenpick Resort in Karon from today until Thursday, the TPMP saw a chance to confront senior figures in the Thai government to call for them to pay more attention to the sustainable exploitation of the Mekong.

The Xayaburi Dam project on the Mekong river in Laos, currently under construction, is aimed at giving the impoverished country an income from electricity generation.

If completed, the dam, 810 metres long and 32 metres high, would be capable of producing 1,260 megawatts of electricity. Ninety per cent of that would be sold to the Electricity Generating Authority of Thailand (EGAT).

The Xayaburi Dam is the first of 12 hydroelectric projects proposed for the Mekong River and its tributaries under a blanket vision of the river becoming "the battery of South East Asia".

On April 17, a Thailand-based company, Chor Karnchang, signed a B51-billion contract with a Laotian company Xayaburi Power to build the dam.

Construction began in March, sparking outrage from the TPMP because the project's environmental impact assessment has yet to be completed.

Niwat Roykeaw, a leader of the TPMP, explained that the project would have a major effect on the ecology and local communities downstream, in Thailand, Cambodia and Vietnam.

According to eco-campaigning organisation <u>International Rivers</u>, the dam, when complete, will result in the forcible resettlement of more than 2,100 people, directly affect the livelihoods of more than 200,000 others, and bring permanent ecological change to the river, which feeds millions of people.

Mr Niwat added that the start of construction breached the Procedures for Notification, Prior Consultation and Agreement (PNPCA), which states that the nations along the Mekong River must consult the MRC before building a mega project on the river.

"The governments of four nations [along the Mekong] and the MRC must get serious about the PNPCA," said Mr Niwat. "This project will bring conflict between nations."

However, the CEO of the MRC, Hans Guttman, told media that although the MRC acts as a coordinator among Mekong nations, it has no power to make decisions on the dam.



The Lao government is preparing for construction of the dam, he added, but has not yet decided absolutely whether to go ahead.

"The decision depends on the Lao government," said Mr Guttman.

The TPMP said it will watch the MRC's reactions to events in Laos "for a period of time".

If no "action" is taken, a TPMP spokesman said, the group will up the stakes with a blockade of the First Thai-Lao Friendship Bridge, which spans the river between Nong Khai and Vientiane.

"Anti-dam activists picket Phuket meeting", 01/05/2012, online at: <u>http://www.thephuketnews.com/anti-dam-activists-picket-phuket-meeting-30281.php</u>

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* Cambodia pressures Laos to halt work on Xayaburi dam

Cambodia has called for an immediate halt to the construction of the Xayaburi dam in an official protest note to Laos, officials said in a statement last week, as opposition to the hydropower project gained momentum in Thailand.

Lim Kean Hor, Cambodia's water resources minister and its representative to the Mekong River Commission (MRC), an intergovernmental body of four countries that share the river, demanded in a letter to his Lao counterpart Noulinh Sinbandhit that construction on the dam be suspended pending an environmental impact assessment.

"Cambodia's position is that Laos should halt the dam construction while the environmental impact study is being carried out," the Cambodian minister said in the statement, according to

Cambodian online newspaper CEN.

He urged Laos to stick to commitments made at an MRC summit in December, when member countries agreed in principle that further studies were needed on the impact of the dam before it could be built.

The letter comes weeks after Sin Niny, vice-chairman of Cambodia's Mekong Committee, threatened that Cambodia could file a complaint against Laos in an international court if it allowed the dam - which would be the first mainstream dam on the Lower Mekong -to be built without regional consensus.

Since the December agreement to suspend construction, the Thai company Ch Karnchang announced it has signed contracts for the construction of the dam beginning March 15.

Through the MRC, established in 1995, Cambodia, Laos, Thailand, and Vietnam have agreed to a protocol for consulting with and notifying each other about use of Mekong resources, but the organization has no binding jurisdiction.

Thai protests

Meanwhile in Thailand, which will buy nearly all the power generated by the hydro-electric project, opposition to the dam has escalated, with representatives from the country's riparian provinces holding a demonstration outside a MRC conference in Phuket last week.

About 30 protesters representing members of riparian communities in Thailand's eight provinces along the Mekong gathered outside the MRC's Mekong2Rio conference, an international gathering of on transboundary water resources management.

The group's protest followed larger demonstrations outside the Bangkok headquarters of Ch Karnchang and Thai banks providing loans to finance the project.



The protesters are concerned that the dam, which would block fish migration on Southeast Asia's main waterway, could impact the lives of millions in the region who rely on the river for their food and their livelihoods and pave the way for other hydropower projects on the river.

At least 11 other dams have been proposed on the mainstream Lower Mekong, in addition to five already built on the upper part of the river in China.

The protesters were allowed a brief meeting with the MRC chief executive officer Hans Guttman, who told them only preliminary construction had begun around the Xayaburi site and that the commission would consider the concerns of local people, according to Thailand's The Nation newspaper.

The day before the protests, representatives from more than 130 civil society groups issued a statement backing a report that proposes an alternative power plan for Thailand that excludes the Xayaburi dam.

The report, produced by Thai energy experts Chuenchom Sangasri Greacen and Chris Greacen, was presented to the country's Energy Regulatory Commission on Friday and recommends Thailand seek sources of energy with environmental impact less damaging than that of the Xayaburi dam.

The report, "Power Development Plan (PDP) 2012 and a Framework for Improving Accountability and Performance of Power Sector Planning", criticizes the country's plan for investing in energy infrastructure and recommends ways where energy use could be reduced.

"If we can invest in the know-how to manage energy consumption, in sustainable energy, and in production efficiency, not only will the price of electricity be lower, but we can also avoid ... importing energy from high-impact dams such as Xayaburi," Chuenchom Sangasri Greacen told RFA.

She said that Thailand's energy planning process is flawed and that the country should invest in efficiency measures and alternative energy instead.

"We have a better alternative," she said. "According to energy conservation policy, we should invest more in the area of producing better electrical devices, or the standard of buildings instead of building new power plant, or building hydroelectric dams that create impacts to environment."

Reported by RFA's Khmer and Lao services. Translations by Samean Yun and Somnet Inthapannha. Written in English by Rachel Vandenbrink.

"Cambodia pressures Laos to halt work on Xayaburi dam", 03/05/2012, online at: <u>http://www.atimes.com/atimes/Southeast_Asia/NE03Ae01.html?utm_source=Circle+of+Blue+WaterNews+%26+A</u> <u>lerts&utm_campaign=15f1708161-RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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✤ Flood forced 3,700 residents in east China to relocate

NANCHANG, May 1 (Xinhua) -- More than 3,700 residents in east China's Jiangxi Province who are threatened by flood risks triggered by massive rainfall have been relocated, local authorities said Tuesday.

By 5 p.m., continuous rainstorm had affected lives of 201,000 people, and 280 houses had been toppled, according to a statement issued by the provincial flood control and drought relief headquarters.

Over 30,000 hectares of crops were damaged, mainly in cities of Jingdezhen, Fuzhou and Yingtan, said the statement.

By 2 p.m. Tuesday, water levels of three major reservoirs in the province had exceeded the flood alert level, it said.

The provincial government has ordered relevant departments to take precautions to avoid embankment breaching and make preparation for disaster relief work.

"Flood forced 3,700 residents in east China to relocate", 01/05/2012, online at: <u>http://news.xinhuanet.com/english/china/2012-</u>05/01/c_131562471.htm?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=9c90f96bbd-RSS_EMAIL_CAMPAIGN&utm_medium=email

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Scientists Race to Save World's Rice Bowl From Climate Change

This story is part of <u>a special National Geographic News series</u> on global water issues.

Climate change is predicted to cause more intense and frequent floods and droughts in Southeast Asia, threatening the world's rice bowl and millions of people who live there unless preventive actions are taken soon, scientists warn.

At the Climate Smart Agriculture in Asia workshop held in Bangkok, Thailand, last month, climatologists and agricultural researchers discussed farming practices and technologies that could help the region cope with global warming's effects, including rising temperatures, increased salinity, and sporadic rainfall.

The conference was about "bringing all these players together to look at how the research agenda needs to change in the agricultural research world in relation to climate change," said Bruce Campbell of the Consultative Group on International Agricultural Research (CGIAR), which helped organize the two-day workshop.

In addition, scientists at the meeting discussed potential ways to use agriculture to mitigate the effects of climate change by reducing greenhouse gas emissions such as methane. Agriculture, forestry, and changes in land use account for a third of greenhouse gas emissions, said Campbell, who is the program director of CGIAR's Research Program on Climate Change, Agriculture and Food Security (CCAFS).

"That's a significant portion," Campbell said, "but we can reduce it."

(Related: "See the Global Water Footprint of Everyday Crops")

Breaking the Breadbasket?

The countries of South and Southeast Asia are home to more than 30 percent of the world's population, about half of whom depend on agriculture—mainly rice, but also other crops such as wheat—for their livelihoods. But according to the World Bank, global warming could reduce agricultural productivity in the region by 10 to 50 percent in the next 30 years.

Some changes are apparent already. For instance, steadily rising sea levels have already led to an increase in the salinity of the water in Vietnam's Mekong Delta, where the Mekong River empties into the South China Sea. This has forced some people in the region to abandon rice production and shift to shrimp farming.

"In a way, they're prospering from the change because they make more money raising shrimp than from rice," said Matthew McCartney, a hydrologist with the CGIAR International Water Management Institute, who attended the workshop. "But not everybody has the capability to do that. Some people are adapting, but others are losing out as a consequence of sea level rise."



According to the United Nations Food and Agriculture Organization (FAO), rising sea levels will increase salinity in the soils of rice-growing areas in deltas and flood plains of other major rivers in Asia, including the <u>Ganges</u>, the <u>Yangtze</u>, and the <u>Yellow</u> Rivers.

In the long term, such changes could force Asian countries to shift their rice farms to other locations, similar to how some wineries in Australia have moved to lower—and cooler—areas to counter the harmful effects of global warming on their grapes.

"In Asia, there's the possibility that you're really going to have to think more about radical transformations in order to adapt, as the shift from rice to shrimp illustrates," Campbell said.

(Related: "Artificial Crops Water Glaciers in Indian Highlands")

Recharging Aquifers

But in other circumstances adaptation can be incremental, and require only a gradual shifting of farming systems. One such solution discussed at the Bangkok workshop was using Managed Aquifer Recharge (MAR) technology in the region. MAR involves using land in upstream areas of major rivers to capture and store floodwater in natural underground aquifers, and then pump it out during dry spells for farmers to use.

"The idea is to set aside land where you know the soil conditions and geology will allow water to infiltrate very quickly into the ground and pump it out later for irrigation," McCartney explained.

MAR has been used for water storage in arid areas such as Australia and Southern Europe, but not in relatively wet regions that get regular rainfall such as Southeast Asia, he added.

But the use of MAR in the region makes sense, because it could simultaneously solve two major problems that scientists foresee affecting the region. First, it would create a backup source of water that farmers could draw from in times of drought. It could also lessen damage from floods by diverting water from swollen rivers.

"In Thailand, it could have had a major impact in reducing the flooding [last year] in Bangkok," McCartney said. The floods caused \$40 billion in damage.

Early calculations indicate that about 40 square miles (100 square kilometers) of recharge basins could irrigate more than 770 square miles (2,000 square kilometers) of farmland. Rather than establishing one large recharge basin, the idea is to create lots of smaller basins in suitable locations across the landscape.

"You could quite easily make up the loss of production in the land that you've set aside for the recharge basin," McCartney said.

Juliet Christian-Smith, a senior researcher at the Pacific Institute in Oakland, California, agreed that groundwater storage technologies such as MAR could provide useful buffers against the increased variability in rainfall that climate models predict.



"There are a lot of positives associated with storing water underground," Christian-Smith said. "We usually think of our water supply as coming from surface water such as snowmelt and rivers, but in fact . . . much of the water that supports irrigation and our global food supply comes from groundwater and in many cases it is being depleted faster than it is being recharged, leaving room for underground storage."

Because it stores water underground, MAR isn't vulnerable to some of the problems that plague dams, she added. For example, climate simulations predict that many parts of the Earth will experience warmer temperatures, which will in turn increase evaporation rates at dams. "There's also problems with sedimentation, because if you have more flooding, you could have more subsidence and erosion," she said. "That means your dam life and the amount of water it can store is reduced."

CGIAR's McCartney said MAR use in Southeast Asia is still only at the idea stage. "It hasn't gone beyond people thinking about it," he said. "There would need to be quite a lot more research done."

One question that will need to be resolved, Christian-Smith said, is what impact recharge has on water quality. A recent study in Bangladesh, for example, indicates that repeated injection of water into underground aquifers could leach arsenic and other toxic chemicals from the ground and concentrate it in the water supply.

(Related: "<u>Megafishes of the Mekong</u>")

A Novel Solution for Water and Climate

Attendees at the Bangkok workshop also discussed ways to help farmers not only deal with climate change locally, but actually lessen its global impact by reducing the amount of greenhouse gases their crops produce.

One promising technology for doing this is called rice alternative wetting and drying. As the name implies, it involves alternately flooding and drying rice fields to reduce the amount of methane produced. Normally, farmers leave their rice fields submerged for the entire growing season, but this generates methane, a potent greenhouse gas. By drying the fields periodically, scientists at the International Rice Research Institute have shown that water consumption could be slashed by 30 percent and greenhouse gas emissions reduced by 25 to 50 percent, without reducing yields.

"This is a fantastic technology for water savings and greenhouse gas emission savings," Campbell said. "Rice is so important across the whole of Asia that if one could implement this technology in many different places, you could have significant reduction in methane production."

But as with MAR, the details of this technology will have to be worked out before it can be widely implemented. For example, Campbell said, farmers must put much more effort into water management; at the moment there are no incentives to encourage them to do so. In other cases, large numbers of farmers would have to coordinate their flooding and drying cycles for it to be most effective.

Long-Term Management



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While promising technologies, neither MAR nor rice drying will be enough to resolve all of the agricultural problems that scientists predict will accompany climate change, experts say.

"To mitigate negative effects of climate-induced floods and drought require the application of integrated management concepts that have been developed in the past years and are now increasingly applied," said Wolfgang Grabs, a hydrologist with the United Nations World Meteorological Organization, a co-sponsor of the Bangkok workshop.

"These include both structural and non-structural methods," Grabs said, "such as dykes and levees, land use planning, storage facilities for water, improved forecasting and management of water resources, as well as suitable climate change adaptation approaches."

CGIAR's Campbell agreed. "I don't think there's going to be a silver bullet," he said. "You're going to have to do many different things."

"Scientists Race to Save World's Rice Bowl From Climate Change", 02/05/2012, online at: http://news.nationalgeographic.com/news/2012/05/120502-southeast-asia-climatechange/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=d55ce1dfa0-RSS_EMAIL_CAMPAIGN&utm_medium=email

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✤ 50 provinces now drought-hit

Since Feb 2, a total of 36,388 villages in 497 districts of 50 provinces have been declared drought-hit areas, Disaster Prevention and Mitigation Department chief Wibul Sanguanpong said on Thursday.

In the North, they are: Kamphaeng Phet, Lampang, Lamphun, Sukhothai, Nan, Phayao, Phitsanulok, Phrae, Uttaradit, Chiang Rai, Chiang Mai, Phetchabun, Nakhon Sawan, Uthai Thani, Phichit, Mae Hong Son and Tak (17).

Affected provinces in the Northeast are: Loei, Nongkhai, Nong Bua Lamphu, Si Sa Ket, Khon Kaen, Maha Sarakham, Buri Ram, Udon Thani, Amnat Charoen, Kalasin, Ubon Ratchathani, Yasothon, Chaiyaphum, Nakhon Ratchasima, Nakhon Phanom, Surin, Mukdahan, Bung Kan and Sakon Nakhon (19).

Also hit by drought in other regions are: Phetchaburi, Suphan Buri, Prachuap Khiri Khan, Kanchanaburi, Ratchaburi, Chai Nat, Chanthaburi, Chachoengsao, Chon Buri, Trat, Prachin Buri, Nakhon Nayok, Sa Kaeo, and Phuket (14).

"50 provinces now drought-hit", 03/05/2012, online at: <u>http://www.bangkokpost.com/breakingnews/291654/50-provinces-declared-drought-hit?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=d55ce1dfa0-RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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Eastern Water to Boost Spending as Ford, GM Drive Demand

Eastern Water Resources Development and Management Pcl (EASTW), Thailand's biggest private water seller, plans to raise <u>capital spending</u> 40 percent after demand from manufacturers grew at more than twice the pace it estimated.

Investment on water storage and pipelines will rise to about 3 billion baht (\$97 million) this year from 2.1 billion baht in 2011, said Chief Executive Officer Praphant Asava-aree. <u>Sales volume</u> increased by 8 percent to 86 million cubic meters in the first quarter, compared with the company's estimate of a 3 percent growth rate, he said.

The Eastern Water Resources Development and Management Pcl is Thailand's biggest private water seller. Photographer: Dario Pignatelli/Bloomberg

"The company will accelerate the investments to expand water storage and transportation capacity to prevent a repeat of severe shortage," Praphant said in an interview in Bangkok on April 30. "Manufacturers in the eastern region have had a strong recovery in their production" after last year's floods.

Carmakers, petrochemical plants and power producers have raised output as domestic consumption and investments rebound following the country's worst floods in almost 70 years. Eastern Water is also benefiting from an increase in industrial activity in eastern Rayong province, where <u>General</u> <u>Motors Co. (GM)</u> and Ford Motor Co. have plants, after some manufacturers partly shifted production there when their factories in Thailand's central region were damaged by the flooding, said Praphant.

Bangkok-based Eastern Water, <u>controlled</u> by state-owned <u>Provincial Waterworks Authority</u>, sells most of its water to manufacturers in Rayong. The province, 200 kilometers (125 miles) east of Bangkok, is Thailand's largest manufacturing hub.

Eastern Water rose as much as 6 percent to 8.90 baht, a record intraday price, and traded at 8.85 baht as of 12:27 p.m. in Bangkok. The <u>shares</u> have climbed 43 percent this year, compared with a 21 percent gain in the benchmark <u>SET Index. (SET)</u>

Car Sales Surge

The floods that ravaged the central region and Bangkok between September and November disrupted the supply chains of companies from Apple Inc. to Honda Motor Co. Car production rose 11 percent to a record 190,935 units in March from a year earlier, the Federation of Thai Industries said on April 19.

Profit this year will beat last year's record because of an increase in water shipment and tariffs, said Praphant. The company in March raised water tariffs for manufacturers by an average 8 percent, taking advantage of higher demand, he said.



<u>Net income</u> for the year ended Dec. 31 rose 11 percent to 1.01 billion baht, the highest since the company listed on the stock market in 1997, according to data compiled by Bloomberg.

'Biggest Beneficiaries'

"Eastern Water will be one of the biggest beneficiaries in a robust growth of industrial activity in the eastern region following the floods," said Siam Tiyanont, an analyst at Phillip Securities (Thailand) Pcl in Bangkok. "With more relocation of plants by foreign manufacturers, Eastern Water will have to secure enough supply to meet with the further jump in the <u>water demand</u>."

Eastern Water is also considering building a distillation plant to produce fresh water from sea water, said Praphant. The facility would reduce the company's reliance on unpredictable monsoon rains as its main source, he said.

"Eastern Water to Boost Spending as Ford, GM Drive Demand", 02/05/2012, online at: http://www.bloomberg.com/news/2012-05-02/eastern-water-to-boost-spending-as-ford-gm-drive-demand-1-.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=d55ce1dfa0-RSS_EMAIL_CAMPAIGN&utm_medium=email

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✤ 220,000 people lack drinking water in Guangxi

NANNING, May 4 (Xinhua) -- Low rainfall and high temperatures have left 229,000 people short of drinking water in a drought-stricken city in south China's Guangxi Zhuang autonomous region as of Thursday, local officials have warned.

Among those people, 27,250, including 3,398 teachers and students, are having to rely solely on delivered water in the city of Baise in northern Guangxi, said Wan Zhaolong, deputy chief of the city's drought relief office.

In addition, 105,193 heads of livestock have been deprived of drinking water in Baise. The drought has also withered 523,000 mu (34,867 hectares) of crops, Wan said.

Rainfall in April and early May in most parts of Baise was less than half of the normal level for the period, while temperatures were very high, reaching 40 degrees Celsius on April 24 in parts of the city, according to official statistics.

As a result, 46 reservoirs in the city have been dried up as of Thursday, Wan said.

Baise has allocated 12.3 million yuan (1.9 million U.S. dollars) and 232,400 people to combating the drought as of May 1, according to the official.

The drought in Baise is getting more serious, and a growing number of people are relying on delivered water. The risk of forest fire is also high, although the drought may mitigate in late May as Baise enters its rainy season, Wan said.

The dry and hot weather has also affected Guangxi's neighboring province, Guizhou, where 10 counties and cities, mainly in the southwest and north, are in serious drought. The exact number of affected people is yet to be calculated, according to the Guizhou provincial meteorological center.

Doused eastern China stands in sharp contrast to the drought-hit south. In Fujian province, heavy rain has caused floods and landslides and 22,400 people have had to be relocated as of Wednesday.

"220,000 people lack drinking water in Guangxi", 04/05/2012, online at: <u>http://news.xinhuanet.com/english/china/2012-05/04/c_131567400.htm?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=d55ce1dfa0-RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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* Transboundary EIA in Lower Mekong basin almost impossible, experts warn

Experts warned yesterday that it was really an uphill task to conduct a transboundary Environment Impact Assessment (EIA) in the Lower Mekong basin to address the consequences of a project in one country that might affect another.

Most development projects in the Lower Mekong basin countries - Thailand, Laos, Cambodia and Vietnam - have transboundary implications and a significant impact on the environment. Hydropower projects might generate more energy for one country, but they could have a negative impact such as a massive reduction in fish stocks or a deterioration in the environment in another country, Mekong River Commission (MRC)'s environmental governance specialist Nguyen Van Duyen said.

MRC members have their own environment impact assessment laws, but these regulations do not require that transboundary impacts also be addressed, he explained.

Besides, transboundary environmental impact assessments could ignite conflicts among members. For instance, Laos is currently caught in a dispute with Cambodia and Vietnam over the Xayaburi dam, which will be constructed in mainstream Mekong. The two downstream countries want the hydropower project to be halted. Though the MRC facilitated a process to establish a framework for conducting transboundary EIA in 2004, little progress has been made on the issue since then, Duyen told an international conference on transboundary river management in Phuket yesterday.

According to the framework, projects requiring transboundary EIA include hydropower, irrigation, port and river works, industrial and mining projects, aquaculture, navigation and water supply projects, Duyen said.

He added that transboundary EIA should focus on public participation and be accessible to those who might be potentially affected. If a transboundary EIA for Lower Mekong basin is conducted, then it could supplement MRC procedures for notification, prior consultation and agreement, he said. However, he said, little progress had been made in establishing a framework because each country's laws and regulations on EIA are different, he said.

Some members have proposed that the transboundary EIA framework for the Lower Mekong basin should be a non-binding technical guideline for development projects in member countries. Timo Koivurova, research professor of the Northern Institute for Environment and Minority Law at University of Lapland, suggested that countries in the Mekong basin sign the 1991 Convention on Environmental Impact Assessment in a Transboundary Context, which is widely known as Espoo.

Though the Espoo is a regional convention meant mostly for Europe, it has contributed to the development of transboundary EIA practice globally, he said. More than 30 countries have signed in the Espoo convention since it was implemented in 1997. The International Court of Justice cited that the transboundary EIA is part of the general international law, to which all members of the UN are obliged to commit, he said.



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Koivurova used the Baltic Sea Gas Pipeline project as an example for transboundary EIA procedure to be applied to the affected states. More than 300 executives, officials and experts from Mekong countries and other 14 river basins from across the world gathered in Phuket to discuss transboundary river management. One of the topics on the agenda was achieving a balance in development in order to maintain water, food and energy security. The conference, ending with an MRC ministerial meeting today, aims to take a message to the UN Conference on Sustainable Development in Rio de Janeiro next month.

"Transboundary EIA in Lower Mekong basin almost impossible, experts warn", 03/05/2012, online at: http://www.nationmultimedia.com/politics/Transboundary-EIA-in-Lower-Mekong-basin-almost-imp-30181166.html

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Sri Lankan NGO head visits to study environment

Shared environmental challenges can be an entry point for coexistence,' says Dr. Vinya Shanthidas Ariyaratne.

In the semi-arid Eastern Province of Sri Lanka, Sinhalese, Tamil and Muslim populations, who have been rivals throughout their history, struggle over their shared but meager water resources, an issue that one man hopes to help mitigate in part by learning from initiatives taken here in Israel.

"Environment can be an entry point to have a dialogue on shared resources to promote coexistence," Dr. Vinya Shanthidas Ariyaratne told *The Jerusalem Post* during an interview in Jerusalem last week.

Ariyantne is the executive director of Sarvodaya, the largest NGO in Sri Lanka, which has taken part in relief and development efforts in 15,000 villages across the country for the past 50 years. After earning a master's degree in community medicine, a master's degree in public health and two medical degrees, Ariyaratne has been able to help steer the organization founded and still headed by his father.

Since its establishment, Sarvodaya has developed numerous community health programs and worked closely with governmental officials to integrate these programs into the public, according to the group. In the early 1990s, at the peak of the country's separatist war, Sarvodaya initiated a program to help children cope with the psycho-social aftermath, and after the 2004 tsunami disaster, the organization was responsible for coordinating the brunt of Sri Lanka's emergency response.

"The background that I come from is working on development and peace-building," Ariyaratne said.

Coming to Israel as a guest of the British-based Tag International Development organization and the local multinational group Friends of the Earth Middle East, Ariyaratne aimed to explore the ways Israel was handling its own struggles with preserving natural resources, as well as the ongoing cross-border efforts that are necessary to environmental progress.

"Our goal is to partner, to collaborate [and] to forge partnerships with other NGOs in developing countries using Israeli expertise," said Dr. Amos Avgar, chief operating officer of Tag.

While Sri Lanka does not have many historical ties to Israel, Ariyaratne himself actually does, as his father elected to spend time on a kibbutz during the 1960s, learning about how self-sufficient, localized governance systems operate.

"That's how it started," he said, noting that the Joint Distribution Committee ended up being one of the largest donors to Sarvodaya's tsunami relief efforts.

From the JDC, where Avgar worked previously, Sarvodaya then developed its relationship with Tag.

Like the Jordan Valley area, in which Israelis, Palestinians and Jordanians all compete for - and pollute - a very water-scarce area, the dry zone in Sri Lanka's eastern Ampara district contains three



communities that "have localized tension and competition," Ariyaratne said. To that effect, exporting a program like Friends of the Earth's cross-border Good Water Neighbors project could be ideal for the local populations, he explained.

There are certain key differences in terms of water availability between Sri Lanka and Israel, as overall, Sri Lanka has a large amount of precipitation during its rainy season, and even its dry zones are not quite as dry as those here. Nonetheless, changing weather patterns have brought about more extreme droughts, and localized conflicts exist between communities in the water-scarce eastern region, Ariyaratne explained.

The communities located upstream, for example, and use more of the water, leaving a heavily reduced and much more polluted resource for those located downstream, he said.

Lacking environmental awareness, people have polluted the marine ecosystems with residual ammunition from past wars, animal carcasses and chemical contamination from pesticides, which have led to kidney disease outbreaks, according to Ariyaratne.

While the level of microbial fecal material is nothing compared to India's Ganges River, "there are outbreaks of cholera sometimes or of other types of intestinal infections and hepatitis," he said.

In addition to various types of groundwater contamination, the on-land ecosystem has also been facing challenges, as the general increase in population has destroyed natural forests, causing conflicts between humans and snakes and elephants that now have nowhere to turn, Ariyaratne explained.

With the help of TAG, Sarvodaya commissioned local academics from Sri Lanka's Eastern University to conduct a study about which natural resources the populations are competing for, particularly focusing on management issues, according to Ariyaratne.

The goal is to create an educational program detailing how the communities can work together and fix the problem, which will be fleshed out after the baseline study concludes, he said.

"This visit gave me the opportunity to actually see for myself what is happening on the ground here," Ariyaratne said.

Friends of the Earth, for example, brought him to their education center in the West Bank village of Auja, where he saw the integral role that children were playing in increasing environmental awareness.

"You do it very well here," Ariyaratne said. "Here I think people really feel that water is so important."

Ariyaratne was struck by how quickly the Jordan River is drying up and the Dead Sea water levels are depleting but said he was impressed at the way Friends of the Earth was bringing together mayors and people from all three governmental bodies together to fight these issues despite the ongoing political conflict. Friends of the Earth Israel director Gidon Bromberg also visited with Ariyaratne in



Sri Lanka about two months ago in order to offer his expertise to the situation there, Ariyarante explained.

"I think that both Friends of the Earth and Sarvodaya believe in educating the people and getting people to take action at the first level," he said, noting that only then will politicians join the effort. "I think if you can have success stories on the ground, then we can convince them."

In addition to meeting with Friends of the Earth representatives, Ariyaratne also visited officials from the Foreign Ministry's Mashav program, which has been funding a program bringing Sri Lankan agriculturalists to come learn in Israel, as well as the company Netafim, which is sponsoring the demonstration phase of a new agricultural program in Sri Lanka. In the Eastern Province city of Batticaloa, made up of mostly Muslim and Tamil communities, the main occupations are agriculture and fishingrelated, but agriculture – particularly rice cultivation – is currently limited to one season due to limited rains, Ariyaratne explained. By adopting Israeli techniques for growing crops in dry areas during the demonstration phase, Ariyaratne said that the Sri Lankan farmers hope to expand their cultivation into two seasons.

Meanwhile, he plans to initiate a program for teaching these innovative agricultural techniques to young people who were taken in as soldiers for rebel groups in the past but now are too old for the traditional schooling system. Already, such youth are partaking in similar programs involving masonry, carpentry, computer and cellphone repair and cosmetology.

Another of Sarvodaya's Israeli partnerships is with the Israel Nature and Parks Authority, which has sent rangers to visit the south Asian country to help develop a "cyber ranger" program for identifying animals. Today, Sri Lankan park rangers garner little respect, something that Ariyaratne hopes to improve by empowering them with technology. Most urgently, the cyber program would give the rangers the possibility to track and perform data analysis on snake bite locations, which have become quite rampant in Sri Lanka's nature reserves, he explained.

While Ariyaratne said he does not believe that uniting groups over environmental issues would bring an end to their political differences, this can be an effective strategy to get people to begin talking.

"I think it's a good entry point but as we all know ultimately we have to have political commitment.

If we can use the environment to convince politicians, then there is a lot of potential in that," he said.

"Sri Lankan NGO head visits to study environment", Sharon Udasin, 30/04/2012, online at: <u>http://www.jpost.com/Sci-Tech/Article.aspx?id=268009</u>

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WATER RESEARCH PROGRAMME -Weekly Bulletin-

Water Ills Focus of New Documentary

Last Call at the Oasis highlights global water crisis but opines that the "glass is half full."

A new enviro documentary about water by the <u>"company that brought you</u> *An Inconvenient Truth, Food, Inc.* <u>and Waiting for Superman" [video]</u> attempts to accomplish three things: inspire you with the beauty of water, scare the bejesus out of you about a <u>"global water crisis"</u> that is "the central issue facing our world this century," and at the same time leave you with an optimistic message that there are solutions to <u>"this problem if</u> we are willing to act now."

While there is a lot to recommend in the film -- including a plethora of important information and scientific findings we all should be aware of -- the overall result is a bit schizophrenic. I was inspired at times, convinced we've got a world of troubles, but nonplussed by the uplifting, optimistic spin at the film's end.

The Ecstasy -- Water as Inspiration

The most enthralling part of *Last Call at the Oasis*, directed by <u>Oscar-winner Jessica Yu</u>, by far happens during the opening segments of the film when we are treated to a sequence of water shots -- flowing water, splashing water, droplets of water, and people drinking, swimming in, bathing in, just plain in ecstasy over water. Vaguely reminiscent of the early documentaries known as the "city symphonies" (see <u>here</u> and <u>here</u>) or maybe a cross between them and the opening paean in Woody Allen's *Manhattan*. Amazing, beautiful stuff -- worth the price of admission.

The shift from inspiration to water troubles occurs with the voice of <u>Erin Brockovich</u>, you know, the singlemom-turned-environmental-activist who became a household name when Julia Roberts embodied her in the eponymous <u>movie</u> by Stephen Soderbergh. The real-life Brockovich, one of the film's lead voices, frames the theme of *Oasis* -- the centrality of water to our existence. (Minor science peeve: Brockovich says that water is the essential "element" for life. Actually not -- water is a molecule not an element.)

And the Agony -- The Water Crisis, Part 1: Not Enough

The film's main thrust focuses on two aspects of the water crisis: the shortage of fresh water and the dangers of pollution in drinking water.

The depiction of the water-shortage issue features world-renowned scientists: <u>Peter Gleick</u> of the Pacific Institute (whose Freedom of Information requests have turned up at least "100 cases of bottled water recalls that we know about for things like coliform bacteria"), <u>Aaron Wolf</u> of Oregon State University (whose study of documented water disputes over the past 50 years showed that of the 1,800 disputes, "two thirds were cooperative" and involved "very little violence and no wars"), and <u>Jay Famiglietti</u> of the University of California at Irvine (who believes the problem is far greater than mass conservation can resolve).

They do a very good job of laying out the scientific information on why and how our use of water in some regions is overwhelming supply and is not sustainable. And while scientists often get knocked for being technocratic, data-spouting talking heads, these guys do, in this humble scientist's opinion, an excellent job of being relaxed, likeable, and engaging.

A good deal of this section of the film focuses on the arid American West, including California's <u>Central</u> <u>Valley</u> and Las Vegas, where growing demand for water, fueled by urban expansion and rapid development



coupled with dwindling supply (caused by droughts and climate change), threatens to leave millions of people high and dry.

The Agony, Cont. -- Water Crisis, Part 2: Pollution

Our spokespersons for the section on water quality are activist Brockovich and Tyrone Hayes, a scientist at the University of California at Berkeley.

Brockovich, no stranger to the camera, takes us to Midland, Texas, where, even though <u>folks' well water is</u> <u>polluted by hexavalent chromium</u>, a carcinogen, they can't find anyone in government or industry willing or able to do anything about it. (The wrap-up section to the film's many story threads informs us that in Hinkley, California, the site of Brockovich's original activism brought to light in the 2000 Soderbergh movie, the electricity company PG&E "offered to buy over 100 homes in the contaminated area.")

Brockovich then discusses a project she has undertaken, creating a map of all the locations from where she has received emails and other communications from people all around the country reporting community health problems. The map, showing affected places across the entire United States, is pretty sobering and at a Senate hearing appeared to get the attention of Senator Barbara Boxer (D-CA), but let's be a little careful -- a database compiled from emails is hardly scientifically rigorous.

Hayes's portion of the film features his work on the effect of water pollution from pesticides on frogs. This section has a light note to it, with clips of hermaphrodite frogs trying to couple, as Hayes looks on in a mix of dumbfounded delight and near disbelief.

Solutions, Yes ...

This is all fairly daunting and eye-opening and should give us all pause. But one thing Participant Media, the production company behind the film, strives for in all of its movies is to "inspire social change," as the production notes put it. And so director Yu has made sure that her audience hears about what can be done to conserve water and use it more efficiently. My guess is that you are already aware of most of these -- like cutting back on watering lawns, using low-flow toilets, not buying bottled water -- but they are worth repeating. Even though they're easily incorporated into our everyday lives, there are an awful lot of folks out there who fail to partake. Case in point: the thriving business in bottled water.

I found quite interesting the segment on using recycled/purified wastewater -- including from our toilets -- for drinking water. We visit with the astronauts on the Space Station while they slurp up water that had formerly been their urine and with a PR firm trying to come up with catchy brand names for bottled water derived from sewage. (The winner? Porcelain Springs, which then gets a plug from actor Jack Black. The testing out on the public is highly amusing.)

But ...

While this is an important film and worth checking out, there's stuff that bothers me a bit. For one, the solutions touted in it, like using a low-flow toilet, are nice, but they're not going to solve the water-shortage problem. Much more fundamental change is needed, and that brings me to my next point.



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Agriculture is a huge water issue that does not get much air time in *Oasis*. In the film the major culprits causing water shortages are urban development and water-wasting people. But the fact is that agriculture is by far and away the greatest user of water.

If we want to solve the water-shortage issue, we ultimately have to address water usage in agriculture. And it's not just water availability; it's also water quality. Agriculture is responsible for a good deal of the fresh water pollution in the United States.

We're not going to solve our water problems without coming to terms with agriculture as a profligate water user and polluter.

And while we can't survive without water, we also need food, and food comes from agriculture. *Oasis* would have been a far more incisive film if its solutions included ones that addressed that little conundrum.

In addition to being at the root of many of our water problems, food production is also a driver of other serious environmental problems: loss of habitat and biodiversity, carbon emissions and climate change, dead zones in the ocean, pesticides and antibiotics in our food. Solving these problems is no easy task. We face a world where we will need to feed nine billion people. It's not obvious how we will do this while also lowering the environmental footprint of agriculture.

The intended theme of the movie may be that the "global water crisis [is the] central issue facing our world this century," but it left me thinking about a coming global crisis in food production.

Last Call at the Oasis began its screening rounds on the documentary festival circuit in March and will begin a national tour in selected movie theaters around the country starting on May 4 with showings in New York and Los Angeles. Check it out and share your thoughts with us.

"Water Ills Focus of New Documentary", 02/05/2012, online at: <u>http://www.huffingtonpost.com/bill-chameides/water-ills-focus-of-new-</u>

<u>d b 1472990.html?utm source=Circle+of+Blue+WaterNews+%26+Alerts&utm campaign=15f1708161-</u> <u>RSS EMAIL CAMPAIGN&utm medium=email</u>

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As Yemen's Water Runs Dry, al-Qaida Runs Rampant

We've talked about the internal struggle waging in Yemen to control its oil resources, the revenues from which can buy patronage for a new regime, but water is the other liquid gold informing the conflict, and as al-Qaeda steps in to wield control over a country running dry, it becomes easier to map the conflict in terms of water shortage.

As a showdown with Houthi rebels ensues in the north, separatists fight government forces in the south, groups linked to al-Qaeda in the Arabian Peninsula (AQAP) step up attacks and make territorial gains, a divided military fights itself, split between a new interim government and the unrelenting network of ousted President Saleh's friends and family, water becomes a main currency charting the complexities.

The link between water scarcity and conflict in Yemen may appear to be indirect on a broader level, but that makes it no less pertinent.

The rebellion of Shi'ite Houthis is centered in the Sa'ada region, in the country's north on the border with Saudi Arabia – an area that has been in the grips of a profound water crisis for some years, Dr. Dominic Moran, Arab World Project Coordinator for Greenpeace, tells Oilprice.com.

Likewise, in southern highland areas now controlled by al-Qaeda-linked groups, water is a powerful currency as control over the resource is a key priority for villagers. According to Dr. Moran, there are "persistent reports of localized tribal and inter-communal violence over control of wells and water sources, particularly in highlands". When al-Qaeda takes control over these areas, it necessarily brings with it a semblance of authority where no central authority has been able to establish a foothold. Villagers often welcome this new authority, which establishes control over water supplies and manages disputes, as a positive alternative to total anarchy and uncertainty. As such, water becomes a way for al-Qaida to gain support and grow its influence among residents and tribes in the highlands.

"Under Saleh, al-Qaida-linked forces received important combat experience and government largesse to help the government fight against the Houthi rebels. Here again there is an indirect link between water and conflict," Moran says.



Some highland aquifers are falling by 10 to 20 feet annually, threatening agriculture and leaving major cities without adequate safe drinking water, according to the Middle East Research and Information Project (MERIP). "It is no coincidence that these areas are now outside government control," Dr. Moran says.

But the southern lowlands, areas of which al-Qaeda also controls, are similarly suffering from growing water stress. According to a World Bank report, climate change and variability impacts on water balance pose the greatest risk is for reduced water availability in the southern lowlands, which in turn could lend greater impetus to conflict and boost al-Qaida's staying power.

On a broader level, Moran says it is fairly easy to draw a link between the increased intensity of the conflict and the devastating drought in 2008-2009. And the outlook for Yemen's water crisis is bleak, with some experts estimating that the capital, Sana'a, is likely to be the first capital in the world to run dry, while others estimate that it could dry out completely by 2025. Groundwater reserves are likely to be mostly depleted in another two to three decades, irrespective of climate change, reducing agricultural output by up to 40%, according to the World Bank.

Around 97 percent of Yemen's agricultural land is threatened by desertification. The water crisis is, as always, partly man-made, with the International Monetary Fund (IMF) and the World Bank (WB) playing a role through their promotion of unsustainable agricultural expansion.

"The lack of government capacity to enforce new water regulations is a problem shared by many developing states and most Arab states. This makes resorting to legislation and international commitments on water issues, sustainable development and climate change all but impossible to implement on the ground. This situation is exacerbated by endemic corruption, which siphons off the few financial resources devoted to such issues in Yemen," Moran tells Oilprice.com.

The introduction from the 1970s on of new drilling techniques upset traditional agricultural practices that had maintained a balance between supply and demand, allowing both a massive population surge and causing what is now the incipient collapse of often artisanal highland aquifers, Moran notes.

According to the Middle East Research and Information Project, future supply options include pumping desalinated water from the Red Sea over a distance of 155 miles, over 9,000-foot mountains into the capital, which is itself located at an altitude of 7,226 feet. The exorbitant cost of pumping would push water prices up to \$10 per cubic meter. "This is a completely untenable in a situation where most urban residents are working multiple jobs just to survive, and impossible as substitute for agricultural water (which represents 90 percent of usage) depletion," Dr. Moran says.



Another devastating geopolitical dynamic is the effect of water scarcity on demographics. There are real fears of a migratory surge into the Gulf countries and beyond – something Saudi Arabia, which is already contending with the Houthi rebellion on its border and the spillover unrest in its Shi'ite-dominated Eastern Province, should fear most.

Pressures produced by mass unemployment, high population growth rates and environmental degradation developing through growing water scarcity is already promoting a surge in rural-urban migration, estimated at 150,000 in 2009 to the capital alone.

There are also severe health impacts. Yemen has one of world's highest rates of child deformities from malnutrition and is second only to Afghanistan. The average person in Yemen survives on one-fifth of what the World Health Organization (WHO) considers to be an adequate amount of water.

Water has become such a critical factor in the conflict that any operation to determine the extent of al-Qaida's influence in Yemen should begin here, in the southern highlands where radical authority is welcomed in the face of the prevailing chaos, and in the lowlands where water's future is uncertain at best.

"As Yemen's Water Runs Dry, al-Qaida Runs Rampant", 03/05/2012, online at: <u>http://oilprice.com/Geopolitics/Middle-East/As-Yemens-Water-Runs-Dry-al-Qaida-Runs-Rampant.html</u>

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* Kyrgyzstan: Climate Change Creates Agricultural Uncertainty

Water, water everywhere in Kyrgyzstan – except when and where it's needed. Kyrgyzstan is a Central Asian nation that traditionally has been well endowed with water. But, in an era marked by global warming, old assumptions about water supplies are changing, and farmers are getting nervous.

Conditions in Togotoi, a village in southern Kyrgyzstan's Osh Province, help illustrate the challenges. Farmers there are rushing to finish planting their corn, wheat and vegetables by late May. But no one knows whether the province will have enough water during this summer's growing season, as arid summers have become the new norm.

Despite Togotoi's ideal location between two tributaries of the Syr Darya River, one of Central Asia's largest, droughts in Osh Province are increasing in frequency. The area's dilapidated irrigation canals are a primary source of concern. A large share of water that enters the irrigation system is wasted before it can nourish crops. As a result, Togotoi villagers like Stalbek Karimov worry that they won't be able to withstand another season of low rainfall. "Summers are hotter now," said Karimov. "Temperatures are rising and there is less water available."

In Kyrgyzstan, debates over climate change have less to do with emissions targets and green jobs than they do with sick animals, hotter summers and <u>disappearing rivers</u>. Kyrgyzstanis are trying to adapt, but in a country where the <u>political climate</u> can be as volatile as the thermometer, getting new management strategies in place and infrastructure built is a challenge.

"Kyrgyzstan is in a group of countries that have fallen behind [in developing] projects and programs on climate change," wrote Mars Amanaliev, director of the Ozone Center of Kyrgyzstan, in response to questions from EurasiaNet.org. The government agency helps coordinate Bishkek's climate change adaptation projects – a tough task, says Amanaliev.

Among the steps toward a coherent preparedness strategy is the development of a National Action Plan under the guidance of the United Nations Framework Convention on Climate Change (UNFCCC), to which Kyrgyzstan is a signatory. This document, which is supposed to be the product of coordinated planning by 11 ministries and agencies, remains unfinished.

"There is not enough institutional capacity to develop adaptation programs," Amanaliev wrote. "While the concept of the national strategy is being developed, the concrete elaboration of the adaptation program with the participation of all interested ministries and departments is not happening."

Without coordinated government action, communities in rural Kyrgyzstan are forced to cope on their own. "Animals become sick more easily now," said Karimov, the Togotoi farmer. "More livestock are dying."

Another problem is the fact that consensus remains elusive on the extent of the water problem. Perhaps most significantly, debate continues to swirl around the rate of glacier melt in Asia's mountains. A report published earlier this year in the journal "Nature" suggests that Asia's highest



peaks, which provide glacial runoff to 1.4 billion people, have experienced virtually no melting over the last decade. Those findings, however, have drawn criticism from some scientists.

The challenges that Kyrgyzstani farmers face differ depending on the region. For some communities, the biggest challenge might be water scarcity. For others, landslides are posing a greater threat as precipitation patterns change. The only thing for sure is that temperatures are rising, and Kyrgyzstan is among countries most vulnerable to the impacts of climate change.

In its most recent study – the Second National Communication to the UNFCCC, which was published in 2009 – Kyrgyzstan's State Agency on Environmental Protection and Forestry predicted temperature increases across all regions of the country ranging from 3.5 degrees to 8.4 degrees Celsius by 2100. These estimates surpass the 2-degree window that some scientists identify as the threshold to "dangerous climate change."

The economic risks from changes in temperature, precipitation, and the steep increase in reported climate-induced disasters are clear. "The most vulnerable sectors of the economy are agriculture, water resources [for hydropower production], infrastructure and energy," said Amanaliev, the Ozone Center director.

The potential for resource scarcity to ignite social tension is prompting some analysts to label climate change a national or global security threat. But others worry that framing climate change as a security issue obscures the more immediate threat to individual livelihoods in Kyrgyzstan's mountain communities, where impacts to water supply drive economic loss and weather-induced landslides puts lives in danger.

Ann Piersall, a geographer and Fulbright scholar who spent a year studying local perceptions of glacier retreat among communities in the high-altitude At-Bashy Region of Naryn Province, says that people are often uncertain about the changes to their local environment, even in a place where glaciers are visible from most villages.

"The most voiced concern shared by residents was [about] water availability," Piersall said, describing the challenge translating concerns into useful data for planning. Long-term changes are difficult to measure "because historic drought and flood events were often more memorable than trends represented in the climatological data."

"Kyrgyzstan: Climate Change Creates Agricultural Uncertainty", 30/04/2012, online at: <u>http://www.eurasianet.org/node/65333?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=0ddf3e4</u> 583-RSS_EMAIL_CAMPAIGN&utm_medium=email

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***** Green targets being watered down for UN summit - observers

(Reuters) - Some of the main proposals in a draft text for negotiation at a U.N. sustainable development conference next month are being watered down at informal talks in New York, observers said on Tuesday, heightening fears the summit will fail to deliver.

The Rio+20 summit in <u>Brazil</u> from June 20-22 is expected to draw more than 50,000 participants from governments, companies and environmental and lobby groups.

It will try to hammer out sustainable development goals across seven core themes including food security, water and energy but is not expected to produce mandatory targets.

Informal talks are taking place in New York until Friday to shape the main negotiating text.

One area of discussion is how to measure economic growth to take into account the value of natural assets, such as water and forests, as well as innovative financing, phasing out fossil fuel subsidies and a plan to help prevent ocean acidification.

Participants said there had been moves to water down a clause which would require companies to include sustainability information in their corporate reporting.

"It appears to be batting to and fro in a tennis rally here," David Pitt-Watson, chairman of investor Hermes Focus Asset Management, told Reuters from New York.

"There have been suggestions for watering down and also for putting the clause back in as it originally was," he said.

Investment and pension funds would like the measure agreed so they know as much as possible about the "green" credentials of a company before investing in it, which could help open up their trillion-dollar assets for more clean energy investment.

Steve Waygood, chief responsible investment officer at Aviva Investors, representing a coalition of investors worth \$2 trillion which backs the proposal, said: "Currently 75 percent of companies do not report on sustainability issues at all.

"Without this convention, at the current rate it will be decades before sustainability reporting is common practice across global markets."

FALTERING AMBITION?

The U.N. Earth Summit in Rio 20 years ago ultimately led to the Kyoto Protocol on capping emissions of planet-warming greenhouse gases and a treaty on biodiversity.

Since then, successive attempts to secure a new binding pact to cut emissions have failed, public interest in climate change has waned and many world leaders are focused on financial woes.



Rio+20 secretary-general Sha Zukang said in a blog June's summit should at least launch a process which leads to new sustainable development goals being set.

The original 19-page draft text has grown to just under 200 pages along with supplementary texts and could be revised at a final round of informal talks in Rio from June 13-15.

"With only 10 working days left for discussions before the text is presented to Rio, leaders need to be more ambitious about what they hope to achieve," said Lasse Gustavsson, executive director of conservation at WWF International.

Language on phasing out "market distorting and environmentally harmful" subsidies, including for fossil fuels, agriculture and fisheries, could also be weakened or dropped after opposition from Japan, the United States and Canada, observers said.

More than 130 heads of government and deputies are on the summit's speaker list but some major figures, such as U.S. President Barack Obama and British Prime Minister David Cameron, are not expected to attend.

The Danish presidency of the European Union recognized last month that ambitions among EU countries might be waning to define concrete action on water, marine environment, land-use and biodiversity, sustainable energy, resource efficiency and waste management.

Some have grown tired of U.N. climate meetings after a much-hyped conference in Copenhagen in 2009 failed to deliver a binding deal to halt global warming. Last year, a U.N. summit in South Africa agreed to forge a new deal by 2015, but it will not enter into force until 2020.

Scientists estimate the world's average temperature has risen by about 0.8 degrees Celsius since 1900, and nearly 0.2 degrees per decade since 1979. They say efforts so far to cut greenhouse gas emissions are not sufficient to stop a rise beyond 2 degrees C this century, which risks an unstable climate in which weather extremes are common

"Green targets being watered down for UN summit – observers", 01/05/2012, online at: <u>http://www.reuters.com/article/2012/05/01/us-rio-text-</u> <u>idUSBRE84011T20120501?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=9c90f96bbd-</u> <u>RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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Waterway robbery

FRESH water is one of our most vital resources, but some nations have much greater access to it than others. That is partly down to the geographical good fortune of being sited upstream on a great river. But it is also because there is no functioning international treaty governing the sharing of transboundary waterways. In the age of mega-dams, downstream countries get water at the whim of their upstream neighbours.

There should be a treaty. The <u>UN Convention on the Law of the Non-navigational Uses of</u> <u>International Watercourses</u> was signed 15 years ago. It required countries to ensure the sustainable and equitable use of shared rivers. At the time, only three countries - China, Turkey and Burundi voted against. All three are upstream countries on major rivers. But despite this apparent assent, only 24 nations have subsequently ratified it, 11 short of the threshold that would bring it into force.

Some countries' reluctance to ratify the treaty is laughable. When questioned three years ago, the UK government claimed it did not want to "burden partner countries", though it did not say who those partner countries were or how ratification would burden them. At least <u>China said what it meant</u>, arguing that it has "indisputable territorial sovereignty over those parts of international watercourses that flow through its territory".

This week, we report escalating concern about China's bullying tactics over five mighty rivers flowing out of Tibet, upon which downstream countries including Bangladesh, Cambodia and Vietnam depend (see "China is taking control of Asia's water tower"). There are many other festering disputes, including on the Nile, Tigris and Euphrates. We also reported recently on a proposed dam on the Guinea stretch of the Niger river, which threatens vital wetlands in downstream Mali (*New Scientist*, 24 March, p 9).

Almost half the world's people depend on water flowing down international rivers. Yet two-thirds of those rivers have no water-sharing agreements. This is a scandal that June's Earth Summit in Rio should address. It should call for rapid ratification of the UN treaty. The world's water bullies need to be tamed.

"Waterway robbery", 30/04/2012, online at: <u>http://www.newscientist.com/article/mg21428623.200-waterway-robbery.html</u>

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International experts gather to discuss ways to manage rising demand for water, energy and food

WINNIPEG—April 30, 2012—Leading international experts, scientists and decision-makers on water, energy and food security are meeting this week to examine how large river basins influence global water, energy and food security, at a forum hosted by the International Institute for Sustainable Development's Water Innovation Centre (WIC) in collaboration with the Global Water System Project (GWSP) in Winnipeg.

According to the World Economic Forum, global demand for water, energy and food is expected to rise between 30 and 50 per cent in the next 20 years. Recognizing the interconnection between these three dimensions is critical to the success of short- and long-term planning required to deal with the anticipated shortages of fresh water. Water shortages will hamper economic development and create large-scale environmental damage and social unrest.

The conference will focus on innovations from large river basins around the world, including governance innovation, technology innovation, bioeconomy innovation and case studies that demonstrate the integration of water, energy and food security as drivers and outcomes of basin management.

In many regions water is a determining factor on energy and food security through multiple pathways including drought and flooding, irrigation, bioenergy, hydropower and thermal power production.

The conference sessions include an overview of WIC's Lake Winnipeg Bioeconomy Project and case studies on integrated approaches to water, energy and food security in major basins based on a GWSP survey. The survey included studies of the Amudarya, Danube, Jordan, Nile, Rio de la Plata, Nile, and Lake Winnipeg basins, among others.

WIC has built on its international research and experience in global and regional watershed management to develop and implement bioeconomy solutions that address water, energy and food security in the context of Canada–United States transboundary issues in the Lake Winnipeg Basin.

Speakers include: Howard Wheater: Canada Excellence Research Chair in Water Security Janos Bogardi: executive officer of the Global Water System Project Slobodan Simonovic: Institute for Catastrophic Loss Reduction Bradley Doorn: Agriculture, Carbon, and Water Applications, NASA David Brooks: senior associate, IISD Claudia Pahl-Wostl: University of Osnabrück, Germany Jim Bruce: consultant (Ottawa) and former assistant deputy minister at Environment Canada

"International experts gather to discuss ways to manage rising demand for water, energy and food",30/04/2012, online at: <u>http://www.newsroomamerica.com/story/240488.html</u>

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Solution Environmental Peacemaking May 2012 Friends of the Earth Middle East

Jordanian Parliamentarians visit Bakoura

On April 15th, FoEME took members from the Committee of Environment and Health in the Lower House of Parliament of Jordan to Bakoura, a military-controlled region near the border between Israel and Jordan. There, FoEME Amman Director explained the need to make the Bakoura region into a National Park, which would serve to increase eco-tourism and GDP in the region, as well as highlight the environmental, cultural, religious and historical significance of the area.

FoEME staff members showed the parliamentarians and journalists around Bakoura, stopping at the remains of the hydro-electric power station and three bridges spanning the quiescent Jordan River before leaving the region. The parliamentarians responded positively, and expressed that they would support a motion in Parliament to make the Bakoura National Park a reality.

Read more about what one journalist thought of the excursion in this Ad Dustour Article (Arabic), and on our blog.

FoEME in Tamera Portugal Water Symposium

The Second International Tamera Water Symposium, "Retention Landscapes as an Answer to Desertification and Globalization" held in Tamera, Portugal, invited FoEME's Palestinian Director as a speaker for their Middle East Working Group, to present our Jordan River Rehabilitation program.

The symposium was convened to introduce a concept – through the example of the water retention landscape of Tamera – of how desertification can be reversed and the water cycle cured. Water experts, politicians, scientists, media representatives and specialists from around the world attended the conference to share their knowledge, exchange ideas and present their work publicly.

Last call at the Oasis - Opening in Select Theatres

"Last Call at the Oasis", a new film by the producers of An Inconvenient Truth, is about the worldwide water crisis. Pollution, overconsumption, and climate change are threatening communities worldwide with water shortages, but the film — which opens at select theatres in New York and Los Angeles on May 4th, and in the E Street Cinema in Washington DC on May 11th — is entertaining, alarming and surprisingly, turns to Friends of the Earth Middle East's Jordan River Rehabilitation program for solutions! Click here for more information about the film.

Israeli Public Hearing on Launch of Lower Jordan River Master Plan

This month, the Israeli Lower Jordan River Drainage Authority held its first public hearing presenting the Authorities' plan to produce a master plan from Naharayim to Bezek Stream on the Israeli side. Findings of initial studies on ecology, archeology and cultural heritage were presented as well as an overview of future project outputs.

The hearing was very well attended, including the participation of many residents and former mayors and municipal staff, who over the years have participated in many of FoEME's activities along the river valley. The Israeli government effort represents an important expression of political will towards the rehabilitation of the river – though the commitment of actual water quantities to be released remains well below what FoEME studies identified as needed.



The need for a regional effort was highlighted during the public hearing, including the opportunity presented by the regional NGO master plan that FoEME will launch in the coming weeks.

The Jordan River Rehabilitation Project is supported by the Swedish International Development Agency, the Richard and Rhoda Goldman Fund, the Global Nature Fund / Ursula Merz Foundation and the Osprey Foundation.

Protecting Groundwater projects signs mayors on MoU

On April 18th, the Head of the EU Delegation in Tel Aviv, HE Ambassador Andrew Standley hosted a MoU Signing ceremony for 9 of the Israeli municipalities participating in FoEME's "Protecting Groundwater" project. The MoUs reflect a commitment to protect groundwater resources, and is a milestone of trust and cooperation, built between FoEME and each municipality, with the support of the EU.

"Protecting Groundwater" is an international project aiming to empower selected Mediterranean basin municipalities with the technical and administrative skills to alleviate sources of groundwater pollution in their jurisdiction, as well as enhancing cooperation to protect common natural heritage. The project includes 28 municipalities from Spain, Palestine, Jordan and Israel.

The "Protecting Groundwater" project is supported by the European Union's ENPI CBC Mediterranean Sea Basin Programme.

Hebron Site Tour

On April 25th, FoEME held a site visit in the Hebron Industrial Area in an effort to better understand the current status of wastewater management from local stonecutting and leather factories. The group toured the Hagar Wastewater Treatment Plant, currently functioning at 50% capacity, as well as the downstream Palestinian community of Yatta.

FoEME is currently supporting efforts to advance comprehensive water treatment capacity upstream in Hebron, working with the EU, World Bank, and representatives from Palestinian and Israeli communities along the river who are suffering from a constant flow of untreated wastewater from industry, slaughterhouses, sewage, and agriculture. The photo shows that not all of the slurry is poured into the Hebron stream. The challenge however, is to recycle more of it.

Israeli Teachers visit GWN community Ghor Safi

FoEME Jordan was pleased to host 18 teachers from Israel in Ghor Safi, one of our Good Water Neighbor's communities in Jordan.

The group learned about FoEME's environmental education program, taking much interest in our efforts to develop a Regional Environmental Education Resource Guide for educators. They also visited several stations of Ghor Safi's Neighbors Path, including Lot's Cave, Wadi Numeira and the Dead Sea Harmony Center. They enjoyed lunch prepared by the local women of the community at the Ghor Haditheh Center for Disabled Persons, and had a chance to see the 'wise-water ecogarden' built on the Center's grounds by GWN youth 'Water Trustees' of the community.



Sri Lankan CEO visits the Good Water Neighbors Project

Following FoEME's visit to Sri Lanka in January, the Good Water Neighbors project hosted Dr. Vinya Ariyartne last week, director of the largest NGO in Sri Lanka called Sarvodaya, for a reciprocal visit to the region, supported by the UK TAG Foundation.

Dr. Ariyartne and delegation visited Good Water Neighbors communities to see the project 'on the ground' and to study the feasibility of adapting the project's methodology to Sri Lankan communities in conflict. The full day tour started at the West Jerusalem community where Dr. Ariyartne heard about the educational approach to environmental peacebuilding in such a complex reality, and then travelled to Auja and the Dead Sea to continue the study tour.

Earth Day events with FoEME

Friends of the Earth Middle East joined thousands in Tel Aviv's central square to celebrate Earth Day 2012. FoEME staff members invited the public to visit its Good Water Neighbors communities' Neighbors Paths throughout the country to get to know the region's shared water resources including the Jordan River, the Mountain Aquifer and the Dead Sea.

The Sharhabil bin Hassneh EcoPark was full of youth this month – of all ages, and from all over Jordan. A group of 30 students from the International Academy in Amman came to the park for a 3-day youth camp, participating in workshops, pruning and caring for the trees that had been recently planted as part of the restoration efforts of the park, and other outdoor environmental projects. Another group of 40 youth from the International Independent School attended a youth activity at the Park, learning about conservation efforts and hiking through the park's grounds to get a closer look at the biodiversity that has returned to the area. Another "must" activity was to mark Earth Day, where 60 children came to the EcoPark to plant trees and to participate in a general clean up of the area.

FoEME's EcoTourism on the rise

Heightened interest in FoEME's environmental peacemaking efforts has brought a number of interested groups to our EcoParks and Neighbors Path tours recently. Our Sharhabil bin Hassneh EcoPark in Jordan hosted 3 International groups this month; one from the Council on International Educational Exchange, one from B'Tzedek – both these groups returning for their 3rd year – and an interfaith group from the UK, who also visited our EcoPark in Ein Gedi prior to crossing to Jordan. Our Jordan Valley Environmental Education Center in Auja, Palestine hosted an interreligious faith group from Holland, hiking in nearby Wadi Qelt and the Auja Spring to learn more about the water resources in the region.

Come learn about FoEME's regional efforts to preserve our common natural heritage by visiting our EcoParks and Neighbors Paths!

Read recent press coverage, including articles in the Jerusalem Post, Green Prophet, Ha'aretz, the Huffington Post, and more, on our Good Water Neighbors / Press Coverage 2012 page

The Good Water Neighbors project is supported by USAID, SIDA, the EU Partnership for Peace program, and the Rosenzweig Coopersmith Foundation.



WATER RESEARCH PROGRAMME -Weekly Bulletin-

"Climate Dots" by the Dead Sea – May 5th

Joining the global campaign to raise awareness about the dangers of climate change, FoEME and 350.org are organizing 'A Climate Dot,' this Saturday, May 5th, 2012, by the shores of the Dead Sea, in Jordan at 10:00 a.m. with school children and volunteers. Participants will be holding 350 balloons, which will rise up on 26 meter long strings to bob in the air where the Dead Sea's water level used to be – and should still be. It will be quite a sight to see; a hauntingly visceral depiction of the loss experienced by the Dead Sea, and by us, the residents of this region. Read more on our blog.

"Environmental Peacemaking May 2012 Friends of the Earth Middle East", 03/05/2012, online at: http://mideastenvironment.apps01.yorku.ca/?p=4909

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***** WaterWorld Middle East 2013 opens Call for Papers

LONDON, England, May 3. 2012 -- Following a successful launch event earlier this year in the thriving Middle Eastern market of Qatar, WaterWorld Middle East has now announced its Call for Papers for its 2013 event.

Quickly establishing itself as the region's premier conference and exhibition. WaterWorld Middle East is now inviting utilities, consultancies and technology providers the opportunity to share their knowledge, experience and ideas.

WaterWorld Middle East is set to be held again in <u>Qatar</u> in February 2013, a country that is leading the GCC's economic and population growth. Qatar is already one of the largest consumers of water on a per capita basis and, as a result, is expected to invest a further \$10 billion in water over the next decade.

Huge investment is also expected over the coming years as a result of Qatar hosting the 2022 FIFA World Cup, where the eyes of the world will focus on the region and adequate water services will be required for thousands of additional visitors.

This year the WaterWorld Middle East team is inviting papers on topical issues such as wastewater reuse/recycling, cooling water treatment, drinking water membrane desalination and country or regional water sector overviews.

The full list of conference topics will include: water sector structure and regulation; desalination; strategic planning & management; collection & distribution networks; wastewater treatment; drinking water treatment and industrial water treatment.

Timm Dower, event director, commented: "As well as the strategic conference, <u>WaterWorld</u> <u>Middle East</u> provides a growing exhibition floor full of the latest technological innovations. Delegates can hear about industry developments in the conference sessions and then see the technology first hand on the show floor."

Tom Freyberg, conference director, added: "The peer reviewed, strategic and technical conference of WaterWorld Middle East continues to go from strength to strength. We are expecting to see an increased focus on wastewater reuse, as technological advances help bring down the cost and accessibility of treatment.

"In partnership with an experienced, technical conference committee we are expecting WaterWorld Middle East to be the industry's leading event and help bring international expertise to the region."

"WaterWorld Middle East 2013 opens Call for Papers", 03/05/2012, online at: <u>http://www.waterworld.com/index/display/article-display/0139677671/articles/waterworld/world-regions/middle-east/2012/05/WaterWorld-Middle-East-2013-opens-Call-for-Papers.html</u>

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Sharjah conference to shed light on waste management, eco protection

SHARJAH: Aiming to introduce innovations in areas of solid waste management, sewage and waste water treatment, green buildings, air pollution and alternative energy, the Sharjah Environmental company Bee'ah, in association with Sharjah Expo Centre, will host the second edition of Green Middle East exhibition and conference from Oct.15 to 17.

This is for the second time in a row that Bee'ah is partnering with Expo Centre Sharjah to promote the premier environmental management and technology exhibition and conference.

The association was announced jointly by Khaled Al Huraimel, CEO, Bee'ah, and Saif Mohammed Al Midfa, director-general of Expo Centre.

"Green Middle East offers a platform for top industry organisations to exchange their businesses and technologies within the environment sustainability industry. We are proud to host the exhibition for the second year in a row and look forward to announce major milestones in waste management and recycling," said Al Huraimel.

"It is our commitment to establish effective environmental solutions and ongoing programmes that will uphold the UAE as a model within our region that truly takes the environment in its own hands to ensure its sustainability and protection," said Al Huraimel.

"Sharjah is home to some of the largest facilities and programmes aiming to protect the environment and our natural surroundings. The issue of environmental sustainability has never been more pressing and a show like the Green Middle East will be the right platform to introduce innovations and solutions to environmental challenges, including methods for creating renewable energy, reducing pollution, recycling, sustainable living, green buildings and eco-businesses, within the Middle Eastern region," said Midfa.

"Large amounts of complex wastes are generated daily by individuals, businesses and agriculture. These issues require that waste be handled using environmentally sound and economically sustainable methods,"said Midfa.

"Sharjah conference to shed light on waste management, eco protection", 05/05/2012, online at: http://gulftoday.ae/portal/5c2447b5-1850-4c4f-87d1-29e9cdff6c98.aspx

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Solution Experts warn of climate change threat to NZ coastal communities

WELLINGTON, May 1 (Xinhua) -- New Zealand government scientists warned Tuesday the country needs to plan around the threats of more severe floods as sea levels rise with climate change.

The National Institute of Water and Atmospheric Research (NIWA) said storm surge flooding was starting to occur more frequently on king tides.

Sixty-five percent of New Zealanders including those in 12 of the country's 15 largest towns and cites lived within 5 km of the sea and the country had to plan to manage the growing risks, said NIWA principal scientist Dr Rob Bell.

"Rises of more than a meter by 2100 can't be ruled out, and should at least be considered in assessing the vulnerability of our existing development at the coast," Bell said in a statement.

"New Zealand's Coastal Policy Statement directs that we also avoid further increasing risk in the future. So for large new subdivisions and developments, we should be building into this new development sufficient capacity to absorb even higher rises in sea level, given the permanent nature of subdivisions."

As sea-levels rose, low-lying coastal areas would face an escalating risk from sea flooding, with a present-day 100-year flood event occurring every year if the sea level rose by half a meter, said Bell.

Higher storm surges could damage beaches, seawalls, buildings, roads and other infrastructure, and affect drinking-water supplies in lowland rivers and groundwater.

Scientists are to present a synthesis of projections for sea- level rise and its impact on the coastal environment at a New Zealand Climate Change Centre (NZCCC) conference in Wellington on May 10 and 11.

"Planners and engineers here in New Zealand need sound guidance on what sea-level rises are expected along our shores, working around the key uncertainty about how quickly the polar ice sheets may melt in future," said Bell.

The NZCCC is a joint initiative by New Zealand's government research institutes, including NIWA, and Canterbury, Victoria and Massey universities.

"Experts warn of climate change threat to NZ coastal communities", 01/05/2012, online at: <u>http://news.xinhuanet.com/english/sci/2012-</u> <u>05/01/c_131562283.htm?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=9c90f96bbd-</u> <u>RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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* Australia's Agriculture and Energy Sectors Clash Over Water

GUNNEDAH, Australia — The scale and rapid development of Australia's coal seam gas industry is changing the social fabric of the country's small towns and farming regions. Drilling has bruised agriculture's ego by challenging the decades-long idea that rural areas should be quiet places where landowners have the biggest say.

"I don't want to live in a gas field," says Rosemary Nankivell, a farmer and rancher in the Liverpool Plains, an extensive pastoral area in New South Wales. She clutches a phone in her left hand, resting her elbows on the kitchen countertop in the house that her family built in 1956. "The harder it gets, the more committed I am at the moment. I am a bit like one of those funny old blue heeler dogs that hang on and are still hanging on, when they should have given up and gone and had a drink of water."

In the Liverpool Plains and elsewhere, the energy industry is bringing hundreds of temporary workers to cohesive small communities and steadily changing the landscape with wells, gravel roads, pipelines, and collection ponds that farmers say are obstructing their cropping patterns. Furthermore, building wells on farmland also lowers the value of surrounding farming properties, while returning little of its big profits back to the local economies, according to some economic reports.

"We've talked the talk for the last three years. Now we'll have to prove we'll do no harm," said Mark Rodgers, a former farmer who is now employed as the Gunnedah region's land access coordinator for Santos, an Australian energy company.

But even as both sides argue, often talking past each other, the one impediment that cannot be ignored, say geologists and hydrologists, is the water supply.

"[Coal seam gas and agriculture] are two industries at play here, and not one industry and one romantic pursuit," Chris Moran, groundwater specialist at the University of Queensland, told Circle of Blue. "And sometimes we get that a bit confused, as coal seam gas is now a second industry coming on top of an existing industry. That actually is going to create friction."

Energy industry executives and the hundreds of people employed in the coal mines and gas fields in Australia have a differing view. They assert that critics exaggerate the dangers and that markets both inside and outside of Australia are eager for the coal and natural gas that the nation supplies. Moreover, the development of Australian coal seams for natural gas is part of a global fossil fuel boom that is recharging economies in the West, shifting the balance of trade, and prompting record growth in Asia.

Energy and agriculture — Australia's two great primary industries — are some of the largest users of water in the country, as they are in most other industrialized nations. And in the states of New South Wales and Queensland, which share distinction as some of Australia's most important food and energy development zones, the challenge of ensuring adequate, clean water and land for both industries has not been assured.



Two Industries, Two Problems

In a nation buffeted by recurring droughts, it is not surprising that public anxiety about the gas industry has grown dramatically as the energy sector has stepped into highly productive agricultural regions.

Soaring energy production requires a lot of water in a nation that is already over extracting from its rivers and aquifers, primarily to supply the farm sector and growing cities. Over the next 25 to 35 years, the coal seam gas industry alone could pump between 300 million and 1.5 billion cubic meters (80 billion and 400 billion gallons) of water annually in Queensland and New South Wales, the two states at the epicenter of the nation's hydrocarbon boom. This is between two and nine times more than what the entire mining industry is currently using in these two states.

And, some experts say, it could add even more stress in a region that is already extracting 23 times as much water for agriculture than for mining.

"These water systems are already vastly over-extracted, and there are very severe environmental consequences [to taking additional water]," said Dr. James Pittock, researcher at the Australian National University in Canberra, the nation's capital.

Agriculture currently comprises about half of Australia's water use, down from 65 percent during the 2004-05 fiscal year, when a dire drought in the country forced many farmers to vastly improve their water practices. Reining in often wasteful water use by irrigators is at the center of a controversial plan to manage Australia's largest river system, the Murray-Darling Basin, where current extraction does not leave enough water for the environment. But ensuring enough water for farming is an important priority in a dry country that sources more than 10 percent of its GDP from agriculture and prides itself as a major global food exporter.

The nation is also quickly becoming a major global energy exporter, however. There is rising demand for natural gas — particularly in Asia — and Australian companies are eager to produce the resource from coal seams, shipping it as liquefied natural gas (LNG) to China and other customers. According to industry estimates, Australia has about 250 trillion cubic feet of coal seam gas reserves, enough to power a city of 1 million residents for 5,000 years.

The Great Artesian Basin, among the world's largest underground water reserves, is a major source of water supplies to farms and cities. It also underlies most of the nation's coal and coal seam gas reserves, as well as Australia's ailing Murray-Darling Basin. Current total extraction from the Great Artesian Basin is about 540 million cubic meters (143 billion gallons) a year, or almost twice as much as the coal seam gas industry is expected to pump out from underground aquifers each year, according to Australia's National Water Commission.

In other words, the risk is not so much of the Great Artesian Basin being depleted as it is what to do with all that produced wastewater.

Critics say that the drilling process could foster leakages between different underground layers or that it could depressurize clean aquifers, making it harder for farmers to access their water. They also fear



that coal seam extraction and conversion to natural gas could produce large quantities of wastewater, which is often a salty brine that requires treatment.

Although some companies have proposed to treat and inject the produced wastewater back into aquifers, the majority is treated in facilities on the ground and later released into streams and rivers. Additionally, the tens of millions of tons of salt, which is a by-product of extracting and treating the briny underground water, is largely stored in evaporation ponds — and can escape in floods — though state governments want companies to convert the salt into marketable products.

Yet, despite potential problems for both water supply and quality, Australia's LNG production has more than doubled over the last decade, according to the Reserve Bank of Australia, emerging as a booming AUS\$ 70 billion industry, particularly in Queensland, where 9,000 workers are employed in the gas industry.

Throughout Queensland — and more recently in New South Wales — gas companies are steadily piercing the landscape with drilling rigs. Hotels and motels around construction sites are full. Workers fly in and out. Television stations air daily commercials highlighting the benefits of the gas industry for regional and state revenues, jobs, and even for the farmers themselves.

According to Federal Resources Minister Martin Ferguson, current investments could propel Australia from the world's fourth-largest LNG exporter to the second, after Qatar, and perhaps even the largest, by 2018.

Energy Perspective

The industry says it has been producing coal seam gas in Australia for 15 years and that better science and safety measures mean that water quality and supply will not be affected.

"As we're going forward here, we're providing and doing a lot of monitoring of all the well bores; we're working in order to continue to deepen our understanding; and, as we get new information, we reincorporate it," David Knox, the CEO of Santos, told the Australian Broadcasting Corporation last December. "But what we absolutely support is good, quality science. And, in order to do that, we need to drill holes, we need to explore, and we need to seek understanding."

Yet, according to Dr. Peter Stone, scientist at the Commonwealth Scientific and Industrial Research Organization (CSIRO), there is still very little understanding of the actual effects of the industry on water reserves.

"What we are seeing today is a great deal of concern or debate of what may happen, more than specific instances of impact," he said.

Farmer Protests

Meanwhile, farmers are pressing the government to undertake research on gas drilling's effects on water supply and the treatment of the large quantities of wastewater produced. Moreover, farmers and environmentalists — once unlikely partners — are forming coalitions to respond to the new risks to water supply, now that the energy industry has entered the arena as a stakeholder.



Rural landowners are concerned about the potential that the energy sector will pollute and deplete water supplies, damage aquifers traditionally tapped for irrigation and domestic uses, and reduce the capacity of food-producing land. Environmentalists worry that the growing energy industry will take from the environment's ever-declining share of water.

"I just feel we have no choice. Our water is a finite resource. Once it's damaged, that's it," said Lisa Norman, a Liverpool Plains farmer whose property sits within 800 meters (2,600 feet) of a gas exploration site, and several kilometers from two proposed coal mines. "Coal and gas resources come and go, they come up with new sources of energy — but our water: we all need water to survive."

New South Wales At The Center

Nowhere have the interests of Australia's two primary industries — agriculture and energy — clashed more heavily in recent years than in the Liverpool Plains of northwestern New South Wales. Just outside the Hunter Valley, the region is endowed with rich black soil, good climate, and generations of farming ethos that make it some of the best agricultural land in Australia.

Normally mingling at tennis and tea parties, Liverpool Plains farmers are now bonding at protests and blockades against Santos, which plans to drill for coal seam gas in the region. The company currently operates six exploration licenses and several pilot testing wells in a region that spans about 22,000 square kilometers (8,500 square miles), and it plans to start commercial gas production around 2017.

"It is wartime. There is no question agriculture is fighting for its life," farmer Tim Duddy says, his voice building to a slight crescendo. As he speaks, the sun lights the long table in his front yard that he has just set with hot tea, milk, scones, marmalade, and honey.

Many of the Liverpool Plains protests against the energy industry are organized by Duddy, who serves as a spokesman for the Caroona Coal Action Group, a community organization. Duddy's house is on a small hill, overlooking grazing cattle and fields of cotton, sorghum, canola, barley, sunflowers, and corn. His property also sits on a mining exploration lease by BHP Billiton, a coal mining company. The small hills just beyond could soon be host to a proposed open-cut mine for Shenhua Watermark, a subsidiary of Shenhua Energy, the Chinese state-owned giant. Both the mining and gas projects have farmers worried about the consequences for underground aquifers, as well as the dust and noise effects. Landowners insist that the energy industry will irrevocably change their farming. They also question the value.

"You have, on the one hand, a farming industry that looks at the long term. If you look at the return on our investment by percentage wise, you are in it for the long haul," Duddy tells Circle of Blue. "Whereas the gas industry: in three years, it's starting to reach its peak; in nine years, it's just about peaked out; and in 15 years, it's gone."

The mining and drilling industries respond that they are bringing billions of dollars in royalties, income taxes, and export earnings, as well as creating local jobs and boosting demand for a range of local goods and support services.



"New South Wales can have a safe and sustainable coal seam gas industry that co-exists with agriculture and delivers real economic benefits to the wider community," James Baulderstone, vice president for Santos, said in a February 2012 news release.

In a recent report, Santos said that its plans to develop the coal seam gas reserves of northwest New South Wales, including the Liverpool Plains, could deliver a AUS\$ 821 million per year boost to the state's economy through 2035 and create about 2,900 ongoing full-time jobs. In neighboring Queensland, where the coal seam gas industry is soaring, the state's government estimates that the gas projects will create around 18,000 direct and indirect jobs and generate around AUS \$1 billion per year in state revenues.

Though coal seam gas industry executives assert that their drilling practices are responsible and that opponents exaggerate the potential for damage to water resources, Duddy is not convinced.

He turns his back and looks out over the plains: "When you wake up one morning as a farmer, and there are two locusts on the lawn, you actually think, 'Oh, look at those! Aren't they actually pretty green?' You wake up the next morning, and there are 65 million of them sitting out there. You go, 'Christ, we've got a problem!'"

"Well, this is where we are," he says. "There are 65 million of them at the front lawn, and we've got a problem. Because, when there were two, it wasn't a problem."

The Long Haul

Nearby, Duddy's cousin Rosemary Nankivell — a farmer here in the Liverpool Plains, with 2,200 hectares (5,400 acres) of land and 1,000 heads of cattle — is busy typing e-mails, posting Twitter updates, reading Google alerts, and writing statements to the government, the energy industry, and the farming community.

"In the early stages of the campaign, when no one knew anything about coal seam gas, I was probably spending 60 to 80 hours a week writing letters, researching, doing all this sort of stuff," she says of the last three years since Santos announced it was starting to explore for gas in the area. "But it takes a huge gap out of my life. I probably set aside at least 4 days a week, fulltime. So the farming thing is turning into a bit of a nightmare, really... Before I was a farmer — mostly I am a farmer — but unfortunately I don't spend as much time doing what I should be doing."

What Nankivell has been doing is rounding up the troops. Last October, she helped mobilize more than 150 people for a three-week blockade to stop the drilling of a coal seam gas exploration well in the Liverpool Plains.

"In Queensland, [the coal seam gas industry] just snuck in and got away with it, and it happened so quickly," she continues. "People out there were a lot more desperate for money, and they've just come out of drought... They are getting pathetic money, but they accepted it."

Nankivell believes that farmers in New South Wales will be more resistent than their neighbors in Queensland, since most families in her distrcit have been here for many generations. She calls it a "district ethos" — farmers here pass property on to the next generation.



WATER RESEARCH PROGRAMME -Weekly Bulletin-

"We sort of think we are here for a long time," she says, smiling. "And we have an obligation to pass it on in as good as, or even better, condition than what we received it in."

"We think that farming has a great future. But with issues like climate change, huge population increases, urbanization, depletion of groundwater — I think farming has a lot of challenges in front of us. But it's always been a good industry and whether you like it or not, it's a great way of life and it's essential for the future."

This is the second story in a three-part series about Australia's coal and coal seam gas boom. Read the first story on the global demands that are driving Australia's coal and gas export boom.

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[&]quot;Australia's Agriculture and Energy Sectors Clash Over Water", 01/05/2012, online at: http://www.circleofblue.org/waternews/2012/world/australias-agriculture-and-energy-sectors-clash-overwater/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=cd1e9776c5-Weekly_Water_News_May_2_20125_2_2012&utm_medium=email



***** Australia faces the end of Big Dry

Phew! What a scorcher that was.

Australians call it the Big Dry and, after nine parched years, it's over.

It's the drought that has afflicted large areas of this vast country and now the federal government has officially declared it at an end.

The final two areas to be given the all-clear are Bundarra and Eurobodalla in the south-eastern state of New South Wales.

In practical terms, it means that the last of special subsidies to farmers are being withdrawn.

It's the end of "Exceptional Circumstances", or EC, to use the bureaucratic jargon.

"The seasonal outlook is brighter than it has been for many years and the improved conditions are a welcome reprieve for farmers across Australia," said Joe Ludwig, Australia's agriculture minister.

He said the end of the drought would be a "a major milestone for agriculture in Australia".

Since 2001, the government has provided 4.5bn Australian dollars (\$4.7bn, £2.9bn) in EC assistance.

That's the money handed out to struggling farmers, totalling between 400 and 600 dollars each, every fortnight.

'Baffling'

Some farmers say the move to take away the EC assistance is premature.

The National Farmers Federation said the government's "snap decision" to cut subsidies was "baffling".

Some farmers are opposed to declaring the end of drought

"With no areas likely to be drought-declared in the near future and with a programme to develop alternatives already under way, we ask the question of government: why the rush?" the federation's president Jock Laurie said.

Australia's current drought really took hold from 2003 and, depending on the area, has lasted on and off ever since.

But this, the driest inhabited continent, has lived with the scourge of drought throughout its entire history.



Long history

One of the first recorded was in 1803 when there were severe crop failures in New South Wales.

Another, devastating nationwide drought followed in 1902, just after Australia became a federation.

During that one, the total sheep population halved, from just over 100 million to about 50 million.

It wasn't until 1927 sheep numbers recovered.

One of the longest dry periods lasted through the Second World War, from 1937 to 1947, with eastern Australia again the worst affected.

Other bad droughts followed at an interval of about one every decade.

And the pattern has been repeated into the 21st Century.

Australia is drought-prone because of its geography and changeable rainfall patterns.

It's located in a subtropical area of the world that produces dry, sinking air which creates clear skies and little rain.

That means for most of the country, the rainfall is very low and irregular.

Another cause of drought is the El Nino weather pattern.

When there are El Nino weather conditions, Australia becomes drier than normal and the chance of rain decreases.

Population pressures

The succession of droughts has lead some to question the future of population growth in Australia.

The environmental organisation, Sustainable Population Australia, says Australia cannot continue to maintain its current rate of population growth without becoming overpopulated, in terms of access to water.

Their calculation is all the more remarkable, given the current size of the population in relation to the vastness of Australia.

At the moment there are just under 23 million people in a country roughly the size of the United States, which has more than 300 million inhabitants.

The population of Australia is about the same as Texas.



But, even with only 23 million people, the pressures on water supplies are intense.

You only have to follow the caustic ebbs and flows of political debate over the Murray-Darling river basin to realise just how precious and divisive a resource water is.

This vast system, with the Murray and Darling rivers at its heart, covers most of the states of New South Wales, Victoria and parts of Queensland and South Australia.

The recent publication of an official report into its future made headline news, such is its importance to literally tens of millions of people, with everyone from farmers to industrialists to indigenous Australians, laying claim to a stake in the Basin's liquid bounty.

Yet, just when it seems that Australians are doomed to live in a land lacking in water, comes news from the Bureau of Meteorology that 2011 was the third-wettest year on record and the wettest since 1970.

It's this sustained onslaught of rain over the past two years, that has, in part, enabled the government to declare the end to droughts, even if, at the same time, it has also had to deal with the catastrophic flooding that has accompanied the deluge.

The voluminous precipitation of recent times has been largely due to the influence of La Nina, the contrary cousin of El Nino.

La Nina produced slightly warmer conditions in the western Pacific, creating more moist air, especially over the populated eastern states.

But, as with everything Australian, that is not the complete picture, as while the East has been swamped with rain and cool conditions, out West temperatures soared beyond 49 degrees.

That's just the way it is here, a people of moderation existing in a land of climatic extremes.

Finally, it is drought-free. At least for now.

"Australia faces the end of Big Dry", 29/04/2012, online at: http://www.bbc.co.uk/news/business-
17887572?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=5ad114add7-
RSS_EMAIL_CAMPAIGN&utm_medium=email

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Water shortages 'will increase bills', Lords say

The cost of water will have to rise in parts of the UK where it is most scarce, a Lords committee has said.

But <u>the Agriculture</u>, Fisheries and Environment EU Sub-Committee said safeguards must be put in place to protect those unable to pay more.

Peers also urged ministers to speed up their efforts to tackle shortages and encourage suppliers to redistribute water from wetter to drier areas.

The government said a draft Water Bill would be introduced before the summer.

<u>A White Paper on future water policy</u> was published in December 2011.

It contained long-term plans to encourage local organisations to improve water quality, and to take - in technical terms, to "abstract" - water from the environment in the least harmful way.

It also aims to reform the water industry and deregulate markets to allow business and public sector customers to negotiate better services from suppliers.

'Grasp the nettle'

The White Paper promises legislation "early in the next Parliament" and a new regime "by the mid to late 2020s" - but the Lords committee said this timeline "fails to respond to the urgency of the situation".

"Start Quote

If we are to ask people to pay more for this crucial resource in challenging economic times, we must ensure that they fully understand what they are paying extra for"

Lord Carter Chairman, the Lords Agriculture, Fisheries and Environment EU Sub-Committee

"While this may indeed be a complex task, as the government claim, it cannot be as complex as, say, reform of the National Health Service," the report said.

"Consumption of water, whether by industrial or domestic users, must be better adjusted to respect constraints of water availability, through abstraction controls and through economic instruments."

The committee argued that "political direction" was needed to redistribute supplies from "water-rich areas" to "water-stressed areas".

But it noted that even with those sorts of steps, the cost of water would have to rise in areas with the worst shortages - and the government should "grasp the nettle of allowing" that to happen.



Leakage is also still a concern, the peers said, but because the most obvious sources have been fixed, going further will result in "higher costs... which need to be weighed against the likely benefits".

Committee chairman Lord Carter said price increases may be "an inevitable part of helping to secure our water supplies in the future".

But he continued: "If we are to ask people to pay more for this crucial resource in challenging economic times, we must ensure that they fully understand what they are paying extra for.

"They must feel connected to their local areas and know the benefits that freshwater lakes, rivers and streams provide to their local wildlife and ecosystems.

"Without the active involvement of local groups and individuals who know and care for the freshwater bodies where they live, we will struggle to rise to the challenge of ensuring proper protection of our water environment as an uncertain future unfolds."

The peers said Europe as a whole was not doing enough on the issue of water, and the European Union should do more to encourage all member states to develop national water-scarcity and drought-management plans.

A Defra spokesman said bills were set to rise with inflation between 2010 and 2015, which would provide £22bn of investment in the water infrastructure.

"We are aware that we need to tackle the legacy of damaging abstraction and will do so with the introduction of a draft Water Bill for pre-legislative scrutiny before the summer recess," he added.

The Lords report came as Environment Secretary Caroline Spelman suggested standpipes could be needed in the streets next year if England endures another dry winter.

"Water shortages 'will increase bills', Lords say", 02/05/2012, online at: <u>http://www.bbc.co.uk/news/uk-politics-17925822?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=15f1708161-RSS_EMAIL_CAMPAIGN&utm_medium=email</u>

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***** World drinking water, wastewater treatment chemicals market to reach \$26B by 2017

SAN JOSE, CA, Apr. 30, 2012 -- According to a new report from <u>Global Industry Analysts</u>, the chronic global <u>shortage of freshwater</u>, expected to intensify in the coming years, will help drive growth in the global <u>water treatment</u> market. It's further impacted by population growth, growing industrialization, and <u>pollution of water bodies</u>.

The significant rise in demand for potable/fresh water in turn contributes to the rise in demand for a wide array of water treatment products. Increased demand for food and the subsequent intensification of agricultural operations is expected to exert additional pressure on the <u>supply of potable water</u>. This has and will continue to spur demand for <u>desalination</u> of seawater, as an alternative to fresh water reserves.

Increased focus on <u>water reuse, recycling</u> and desalination measures that are aimed at addressing the rising need for safe and clean water remains a core driver of growth in the market. Developing countries are forecast to drive growth with China, India, and Brazil displaying robust demand potential for water treatment equipment, services and supplies including chemicals. This is largely because per capita consumption of water in these countries is poised escalate in sync with improvements in standard of living and the rapid pace of industrialization.

According to the report, a major factor influencing the global Drinking and Wastewater Treatment Chemicals market is the regulatory environment. Governments worldwide are adopting stringent policies and regulations for promoting environmentally responsible behavior among industries and consumers. New regulations for sludge and wastewater treatment will spur demand for specialty chemicals.

Future growth in the water industry will stem from demand for specialized products capable of meeting the requirements of a rapidly changing global environment. In this regard, specialized chemicals are forecast to witness the maximum growth. Specialty chemicals have superior performance and lower toxicity levels and environmental impact. Demand for water reuse and ultrapure water for industrial applications will emerge into a key factor driving demand for specialty industrial water treatment chemicals. Water reuse, especially presents challenges in producing water with acceptable quality, thus providing a business case for high-performance specialty chemicals capable of addressing these challenges.

The trend towards specialty chemicals illustrates the ongoing shift in the market away from highvolume commodity chemicals such as soda ash and aluminum sulfate towards specialty chemicals such as industrial biocides, organic esters, corrosion inhibitors, coagulants, scale inhibitors, pH adjustors, activated carbon, among others.

The European debt crisis is leaving the domestic water industry nervous over the future playout of the crisis, the analysts said. In the industrial water treatment chemicals market, sentiments remain torn between optimism and fear. Outlook in this sector is tempered by fears over a possible escalation in the severity of the Euro crisis, which could result in industrial plant closures and low capacity



utilization rates at customer manufacturing facilities, as a result of weak industrial and manufacturing activity.

At the pessimistic end of the spectrum, bearish market sentiments additionally indicate that a possible shift from fiscal government stimulus to anti-crisis austerity and spending cuts as a measure to tame the towering public debt scenario could impact capital expenditure in manufacturing industries in debt affected economies by limiting borrowing and reducing investments in capital goods.

Interestingly, one of the reasons fingered for the widening debt levels of governments in Southern Europe is the flawed water financing strategies adopted till date. For instance, in Portugal, Italy, Greece & Spain, financing of the water infrastructure is majorly through EU grants and central and local government debts. Investments by private sector have been close to negligible thus resulting in heavy accrued public debts relating to water infrastructure. The austerity measures likely to be initiated to counter the crisis will likely limit the government's investment and expenditure in the water sector, thus impacting new projects, the heat of which will be indirectly felt by the water treatment chemicals market. Also, the European Union has legislated some of the toughest norms for drinking water quality and wastewater treatment and this provides regulations driven demand a tad higher insulation to the economic blues.

The encouraging performance of the electronics and semiconductor industry has additionally helped prop up orders in the ultrapure water supply business. Also forced austerity measures implemented in Greece to reduce the country's widening deficits, are less likely to be adopted in relatively stronger economies with lower debt loads like in Germany, Spain and Italy. Against a backdrop of a creaking water infrastructure that calls for dire upgradation measures, juxtaposed with dwindling funding resources, municipal water and wastewater budgets are not expected to change significantly, despite financial crisis.

As stated by the new market research report on Drinking and Wastewater Treatment Chemicals, Biocides and Disinfecting Chemicals is poised to witness the fastest growth, trailing a projected CAGR of 4.5% over the analysis period 2009 through 2017.

Key players in the marketplace include Ashland Inc, BASF SE, Buckman Laboratories International, Inc, BWA Water Additives Ltd, Calgon Carbon Corp., The Dow Chemical Company, E. I. du Pont de Nemours and Company, Kemira OYJ, Kurita Water Industries Ltd, Norit NV, Nalco, Organo Corp, Qemi International Inc., and Solvay SA, among others.

"World drinking water, wastewater treatment chemicals market to reach \$26B by 2017", 30/04/2012, online at: http://www.waterworld.com/index/display/article-display/4501109977/articles/waterworld/drinkingwater/treatment/2012/04/World-water-treatment-chemicals-market.html

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✤ The importance of water management to the smart city

This report originally <u>appeared on GigaOM Pro</u> (subscription required).

In the emerging vision for the smart city of tomorrow, we often hear about next generation smart grids, smarter buildings that manage themselves to conserve resources, and smart transportation systems that will lessen congestion.

In fact, Pike Research's Eric Woods recent report for GigaOM Pro, <u>"Key Technologies for the Future of the Smart City"</u> (subscription required) estimated that the global market for smart city investments will reach \$16 billion by 2020 with heavy growth in Europe and Asia-Pacific.



Figure 4: Smart-city and smart-infrastructure investment by region, world markets, 2010-2020

But we hear much less about smart water systems for the smart city, and the need to develop more efficient approaches to water as a resource. Part of this is basic developed world bias. A brief look at the <u>U.N.'s freshwater availability map</u> shows that nations with water stress (less than 1700 cubic meters per person per year) and water scarcity (less than a 1000) are mainly found in the Middle East, parts of Africa, China and Southeast Asia. Most of the developed world has been lucky enough to grow up in areas of relative water abundance.

Urbanization is accelerating, however, with <u>a billion and half people expected</u> to move to the city in the next 20 years, and McKinsey has predicted that by 2030 water consumption <u>will increase by 40</u> <u>percent</u>. There have been signs of problems in international megacities like <u>Mexico City where 5</u> <u>million</u> residents awoke to dry taps in 2009 and Mumbai where <u>5,000 tankers deliver 50 million</u> liters of water each day, the precious resource going to the highest bidders. Even domestically, many continue to point out that with less than 15 inches of annual rainfall and its dependence on water


from the Colorado River, where demand is expected to overwhelm supply in the next half century, Los Angeles's water supply is risky.

One of the first implementations of smart water systems is smart water meters. A report last year pegged the <u>European smart water meter market</u> at 13 billion pounds by 2020, which is interesting given the fact that there are far fewer top down government mandates for smart water meter deployment than there have been for smart meters for the electricity grid. By 2030 <u>Britain hopes</u> to have all homes installed with smart water meters, which utilities use to identify leaks, create peak pricing mechanisms to incentivize conservation, and catch people who are violating water use restrictions. <u>Designs are already circulating</u> that sync water meters with iPads to give users up to the minute info on their water use, which could drive home to consumers the cost of watering that lawn.

Woods's report for GigaOM Pro examined next generation greenfield communities like Masdar City in the United Arab Emerates (UAE). Masdar City use 54 percent less water than the average UAE city and Woods notes that the city is deploying diverse strategies from micro-irrigation to treated wastewater for landscaping to highly efficient water fittings. The goal is to get to 180 liters per day per person from the current norm of 550 liters per person per day in the UAE.

But in the developing world, where <u>1 billion of the 3 billion</u> global urban dwellers live in slums with limited access to clean water and additional water management challenges brought on by climate change induced flooding and droughts, the solutions may be less technological. The solutions in the urban developing world revolve around limiting demand, reducing pollution to the water ecosystem, and preventing leakage from aging infrastructure. Though there is evidence that municipalities are starting to take the initiative, as <u>the city of Mumbai has been working with global meter giant Itron</u> to deploy advance water metering infrastructure. One of the issues is how expensive water has become for the urban poor. A slum dweller in Nairobi, <u>Kenya pays 5 to 7 times</u> more for a liter of water than the average North American.

For the first time in history more Chinese now live in cities than in rural areas with per capita income for Chinese city dwellers three times that of rural citizens. The economic drivers of urbanization will remain strong which means cities will have to get more intelligent in their management of water resources. And that goes for all cities, from Mumbai to LA.

"The importance of water management to the smart city", 02/04/2012, online at: <u>http://gigaom.com/cleantech/the-importance-of-water-management-to-the-smart-city-2/</u>

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New technology to cut cost of producing water

A professor at Abu Dhabi's Masdar Institute of Science and Technology, who has co-authored a book on a technology widely used in desalination and production of drinking water in the GCC region, said modifications in membrane separation technology will help cut costs of doing business.

"Membrane modification techniques are aimed at increasing the efficiency and performance of membrane separation and making them attractive for specific separations," said Dr Nidal Hilal, an international expert in desalination and membrane technology and a professor in nano-membranlogy and water technologies at the Masdar Institute.

Membrane separation is a technology which selectively separates -- or fractionates -- materials via pores and/or minute gaps in the molecular arrangement of a continuous structure.

Membrane separations are classified by pore size and by the separation driving force. These classifications include microfiltration, ultrafiltration, nanofiltration, ion-exchange and reverse osmosis.

Dr Hilal is the co-author of a recently published book by CRC Press, entitled .

His remarks assume significance following an industry study by the Freedonia Group that reports global demand for membranes is projected to increase a healthy nine per cent annually to \$19.3 billion by 2015, while demand for water desalination products and services is forecast to increase 9.3 per cent annually to \$13.4 billion by 2015.

Oil-rich nations are increasingly shifting to more efficient membrane desalination systems, or reverse osmosis, and the Middle East and North Africa will account for about two-thirds of global demand for desalination products and services, the study adds, further pointing out that Saudi Arabia, the UAE and Kuwait are the largest desalination markets in the Middle East.

Dr Hilal's book presents a comprehensive review of the current developments within membrane separation processes with a focus on process optimisation through control of membrane surface properties for key industrial applications. According to him, membrane processes have many other applications apart from desalination.

"Membrane processes are used in pharmaceutical industries to separate valuable medical products as they are capable to separate solid materials such as powders in the size range between one nanometer and 10 microns," he said.

"Membrane modification techniques will have significant impact on industry as they will lead to an improved efficiency of membrane processes that offer more products at less cost."

He said the UAE and the region will benefit from operating better fouling-resistant membranes in RO desalination plants as it will reduce operational fouling problems and therefore reduce cost.

"New technology to cut cost of producing water", 05/05/2012, online at: <u>http://www.chicagotribune.com/news/sns-mct-new-technology-to-cut-cost-of-producing-water-20120505,0,1492171.story</u>

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* The Water Risk Filter Helps Guide Companies to Pay Attention and Take Action

The issues of water and security, whether for nations or business, has been receiving increased attention over the past few years. A report by the American intelligence community warns that water-related problems could lead to destabilization in countries located in North Africa, the Middle East and South Asia. Specifically, as population increases, so does demand for water and the world's population will be faced with scarcities due to climate change and poor resource management. [1] The Report's Bottom Line states: "Between now and 2040, fresh water availability will not keep up with demand... Water problems will hinder the ability of key countries to produce food and generate energy, posing a risk to global food markets and hobbling economic growth." [2]

For global business the issue of water-related risks is prevalent. <u>Previously, this blog published a six-part series</u> about the various risks stemming from water-related issues. In response to the issue, a growing number of tools and indicators have become available to companies to quantify water use and qualify risks and opportunities. The latest one comes from WWF and German development finance institution, DEG. <u>The Water Risk Filter</u> is a comprehensive online application to help companies analyze business activity impacts on local water supplies, understand potential risk exposures, and learn how to address risks in a proactive manner. [3]

The Water Risk Filter enables users to enter non-technical information in a clear and simple manner. The questionnaire is short and meant to capture the relevant factors related to water risks. One of the Tool's strengths is that it depicts the analysis in a concise manner. Results are provided both numerically and visually for each facility entered and affected basin. Another useful feature is the map overlays, which include: annual precipitation, floods, droughts, seasonal water scarcity and access to sanitation just to name a few. Reports are also automatically produced at the portfolio and facility levels. The portfolio level report is structured to mirror the <u>CDP Water Disclosure</u> <u>questionnaire</u> to help encourage greater participation and streamline the entry process.

Now that a company has reports, maps and numerical representation about specific risks it currently faces or may in the future, the next logical step is to seek solutions. While the Tool doesn't provide suggestions relative to the scorecard, there is a structured approach to mitigation that is presented along a spectrum described as "steps" of Stewardship. The spectrum follows from Water Awareness to Influencing Governance in relation to "Physical", "Regulatory" and "Reputational" risks. Each step along the spectrum includes various suggested actions and strategies, supported by case studies and references.

For someone such as myself, not specifically connected with a company but keen to learn, the Knowledge Base component of the website is especially useful. It contains a list of publications, water stewardship initiatives and country profiles that include "Physical," "Governance," and "Geopolitical" aspects to water risks.

While there is an ever-growing number of websites and resources for businesses to learn and assess water use and related risks, the Water Risk Filter is worth a visit. Its clear and concise presentation of a multi-variable, complicated subject gives it strength. For business this could mean a small time investment for a big reward. After all, when the American Intelligence Community provides such a



strong warning about global water risks, shouldn't we all be listening?

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NOTES

[1] New York Times: US Intelligence Report Warns of Global Water Tensions http://www.nytimes.com/2012/03/23/world/us-intelligence-report-warns-of-global-water-tensions.html?_r=1&emc=eta1

[2] Intelligence Community Assessment: Global Water Security https://www.documentcloud.org/documents/327371-report-warns-that-water-shortages-could-threaten.html

[3] WWF in partnership with DEG: The Water Risk Filter http://waterriskfilter.panda.org/Default.aspx

"The Water Risk Filter Helps Guide Companies to Pay Attention and Take Action", 04/05/2012, online at: http://www.justmeans.com/-Water-Risk-Filter-Helps-Guide-Companies-Pay-Attention-Take-Action/53710.html

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Harvesting the Rain

The African Technology Policy Studies Network (ATPS) has carried out a study in Malawi's periurban communities to determine the extent to which harvesting rainwater from rooftops can be used for urban farming.

The study, which was conducted by two University of Malawi lecturers and a Lilongwe Water Board official, comes on the backdrop of the realisation that unco-ordinated and rapid urbanisation in Malawi's urban areas has resulted in the growth of informal settlements.

The informal settlements are marked by destitution and lack of household food security.

Many of the people in these settlements rely on planting maize on small plots to enhance their food security.

These plots rely on rainwater, and if the rains are not good then the crop does not thrive.

Recently, Water Resources Officer in the Ministry of Agriculture, Water and Irrigation, Henrie Njoloma, said the southern African country should take advantage of alternative water sources.

This is because maize, Malawi's staple food, is being threatened by changing rainfall patterns due to climate change.

Njoloma recommended building more sustainable irrigation systems, including removing policies that depend on rain-fed food production and economic activities to control problems associated with the changing rainfall distribution characteristics.

Harvesting rainwater from rooftops and other methods of harnessing could substantially boost food security.

The ATPS study notes that water access in marginal urban areas such as Kauma, Mchezi, Lumbadzi, Dzenza, Ngwenya and

Mtsiriza in the capital city of Lilongwe is a serious problem, particularly for the disabled, femaleheaded households, orphans and people affected or living with HIV or AIDS.

"Over and above their pursuit of daily sustenance, they have to contend with purchasing water, whose availability is erratic and if available, either comes at the wrong time or they have to physically struggle to access it," it says.



ATPS - a multi-disciplinary network of researchers and private sector stakeholders - proposes to create a new culture of harnessing water resources in disadvantaged peri-urban communities.

The group wants to provide knowledge and skills necessary to enhance living conditions of marginal communities.

"The importance of rooftop rainwater harvesting in the peri-urban environment can simply be visualised as a poverty-reduction strategy through improved water supply and sanitation," says ATPS, emphasizing that water deprivation drives poverty.

Many households in Malawi's rural and peri-urban settlements get water from unprotected wells, springs, streams in low lying areas (dambos) and intermittent streams.

The Malawi government estimates that 65 percent of the population has access to potable water.

However, due to poor maintenance of supply systems, only 40 percent of the population is actually served with potable water.

"On the other hand, Malawi has ample water resources with an annual average precipitation of 1 037mm of which 196mm, or about 19 percent, is runoff," says Mloza Banda, a Bunda College lecturer.

Banda adds: "This translates into 18 billion cubic metres per annum as surface runoff."

The Malawi Social Indicators Survey reveals that only 37 percent of Malawi's population has access to safe drinking water within a distance of less than half-a-kilometre of where they stay.

This figure increases to 48 percent when the distance is increased to one kilometre.

"Only 2.1 percent and 16.4 percent of the Malawian population have access to piped water in dwelling houses and a public tap, respectively," states the ATPS study.

The study found out that families in Malawi's peri-urban and rural areas rely on traditional water sources, which are often polluted in the rainy season due to erosion.

A 2002 Malawi government report indicated that the total daily water requirement per person was 30 litres, of which the daily minimum drinking requirement was five litres.

"The need to augment potable water for domestic use through rainwater harvesting is thus attainable and cannot be overemphasised," says ATPS.



During the ATPS study, it was found that 32 percent of households in Lilongwe's peri-urban areas said their principal sources of water were boreholes; while 34 percent said they bought water from private suppliers.

Shallow wells and boreholes are the other major sources.

"Individuals have developed their own water points while a handful of water facilities were developed by NGOs," ATPS noted.

This was augmented by facilities provided by the Lilongwe Water Board and the Malawi Social Action Fund.

The study reveals that half of respondents have not paid or contributed to development of water sources, but have indicated they are willing to do so.

In the six settlements covered in the study, females were responsible for sourcing most of the water used.

A 1993 Malawi government/UNDP report showed that the planned optimum distance that a woman should carry water is 500 metres.

But as women have a particular obligation in maintaining a continual supply of water at home, they have often been involved in providing time and resources for the maintenance of boreholes and other water points.

Overall, the ATPS study indicates that the amount of effort it takes to draw water affects the amount of water drawn.

Tasks that require manual effort in drawing water include walking, drawing, pumping and carrying the water.

These require time and energy, leaving little room for any other activities.

Children also find themselves with little time and energy for schoolwork.

And with women largely responsible for farming activities, the burden on them is all the greater and hence the need for strategies to harvest rainwater as efficiently as possible.

A study of two villages has revealed that a man's work day lasts between four and six hours, while



women on average work 12 hours a day.

It has been further noted that women spend 39 days in a year caring for the sick or being sick themselves.

There is a limit to how much work a person can do and when women are stretched, agricultural production and household needs suffer.

The residents have already tried to harness rainwater.

"Eighty percent of the respondents said they have attempted to get rainwater from the roof for various purposes," says the ATPS study.

"Given that not much has been achieved in the area of work load reduction, the roof rainwater harvesting initiative remains a vital option towards reducing drudgery associated with access to water for domestic use particularly, to ease the pressure of work on women," argue the ATPS researchers.

Apart from providing ready water during the rainy season, such harvesting will also result in reduction in waterborne diseases and infections; regular and timely school attendance by children; time saved from water fetching from distant sources allocated to performing other development activities.

The researchers say the key to unlocking Malawi's water potential is enabling users of all types and stakeholders to undertake new initiatives by lessening or removing constraints to increased access to water.

"This may require that policies and water provision mechanisms and technologies are appropriate for users' needs; that dissemination mechanisms for the same are broadened, and that water provision mechanisms and technologies are realistic in terms of inputs and costs.

"Indeed, oblivious of various financing mechanisms, there is often the overemphasis on cost of technology," the report says; urging that in planning and designing rainwater harvesting, consideration should be placed on existing policies and ordinances that govern various land-use practices and infrastructure development.

The study says blames Malawi's present water policy documents and frameworks such as the Strategic Plan for the Ministry of Water and Irrigation, the Water Policy, the Water Resources Act are "inexplicit on water harvesting".

The Africa Water Vision 2025 suggests that scarcity of water across the continent is not entirely due



to natural phenomena.

It suggests that it is due, in part, to low levels of development and exploitation of water resources even though there is a growing demand for water in response to population growth and economic development.

"The basic challenge is providing increased water supply to meet the various end-use needs, mainly through increasing the capability to harness the flow and stock of available water resources, while improving the quality and efficiency of utilisation of water resources," says the UN-Water/Africa Secretariat.

The ATPS study concludes: "The main task for any institutional and policy framework is therefore, the need to meet individual, community and livelihood needs in a sustainable manner that conforms with the requisite technical, hydrological, environmental, economic and social and legal conditions."

"Harvesting the Rain", online at: <u>http://www.southerntimesafrica.com/news_article.php?id=7055&title=Harvesting%20the%20Rain&type=93</u>

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✤ Government may privatize water supply

You may soon get your Bisleri water through a pipeline.

After telephones and power supply, it looks to be the turn of water supply and sewerage services to be privatized.

Responding to a question in the Parliament, the Water Resources ministry has said that the draft new water policy recommends handing over of the water supply system to private companies. The sewerage (waste) system will be handed over to public-private partnership (PPP) companies, Vincent Pala, junior minister for water resources said.

Pala said that the role of the government will be changed to that of a regulator (umpire) from that of a provider (player.)

"The revised draft National Water Policy (2012) inter-alia recommends that the "Service Provider" role of the State has to be gradually shifted to that of a regulator of services and facilitator for strengthening the institutions responsible for planning, implementation and management of water resources," he said.

The government has successfully implemented the privatization policy as far as power supply is concerned.

In cities like Delhi and Mumbai, power supply has been handed over to companies such as the Reliance group and the Tata group.

The private companies have, since taking over, cut down transmission losses (initially as high as 40%) by preventing theft, replacing uncovered cables with insulated cables and other infrastructure changes.

Similarly, most consumers in India now prefer private telecom companies to the Government-owned BSNL and MTNL, as the latter are seen as less sensitive to customer problems and requirements.

The water and sewerage systems in most cities of India are functioning below requirements. In Delhi for example, transmission losses in water supply are estimated at 40%.

Sewerage systems don't work in many parts of the city either.

Some cities have already implemented the PPP model for sewerage collection. However, water supply continues to be managed by government officials.

"Government may privatize water supply", 04/05/2012,online at: <u>http://rtn.asia/1230_government-may-privatize-water-supply</u>

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Compact water project to improve sanitation in Lusaka

IN the last 20 years, Zambia has under-taken various policy and institutional reforms in the water sector.

Despite such challenges, old infrastructure resulting into intermittent water delivery are still haunting Lusaka.

Further, the capacity of water supply and sanitation service provision has been stretched by a rapid population growth of more than one million.

On March 22, the United States government's Millennium Challenge Corporation (MCC), a bilateral United States foreign aid agency established in 2004 approved a US\$354.8 million Compact with Zambia.

The board of directors' decision was arrived at its quarterly meeting chaired by US Secretary of State Hilary Clinton to lay the foundation for systematic and lasting change in the city's water, sanitation and drainage sector, a critical constraint to economic growth in Zambia.

On May 10, the Millennium Challenge Corporation (MCC) and the Zambian Government are scheduled to sign the \$354.8 million five year Compact.

It is expected that through the Compact, the Lusaka Water Supply, Sanitation and Drainage (LWSSD) project will provide residents with greater access to clean water, better, sanitation and drainage services.

Speaking in Washington DC in April, 2012, when he met the vice-president –Department of Compact Operations Patrick Fine and Andrew Mayock, deputy vice-president for Compact Operations for East and Southern Africa, Minister of Finance and National Planning Alexander Chikwanda paid tribute to MCC and the US government for the gesture.

He said, "The Compact will be the single largest investment in the water sector in Zambia since independence. I also wish to thank the MCC for the technical and financial support that was rendered during the preparation of the compact."

Millennium Challenge Corporation (MCC) provided \$15 million to conduct studies and start up costs for the accountable entity.

Mr Chikwanda said he was aware there would be more work to be done after the signing of the compact.

Some of the works include the preparation of detailed design studies for the sub-projects which is expected to be completed in mid June 2012. Thereafter, the procurement of the contractors is expected to take another estimated six months to be completed.



The actual construction is expected to begin in early 2014.

"As Government, we are looking forward to the implementation of this project because the existing water and sanitation infrastructure in Lusaka is old and the capacity has been overwhelmed by the rapid growth of more than two million compared to 134,000 at independence," he said.

He said the programme only covers Lusaka Province and that the intention of the Government was to leverage for more financing to roll-out the programme to other parts of Zambia.

Against this back-ground, the minister said the support of the American government would be most welcome, especially as the US continues to lead the world in providing development aid even in the face of the austerity measures in all high income economies.

Mr Chikwanda assured MCC of the Government's strong commitment to good governance, particularly the control of corruption, ensuring voice and accountability, civil liberties and maintenance of a conducive economic environment for business.

He stressed that Government would set aside funds for sewer connections for poor households and maintenance of drains to ensure conditions precedent in the compact were met.

And MCC vice-president for MCC's department of compact operations Patrick Fine said his organisation was looking forward to working with Zambia in this partnership with excitement.

He said Zambia would be the 24th country that his organisation would be working with in this partnership but warned that a great deal of work lay ahead if everything envisaged in the compact was to be completed on time.

"We are very happy with the relationship we have with the new government and we hope that there will be no hitches to the programme," he said.

The Lusaka Water Supply, Sanitation and drainage (LWSSD) project was indeed a large and complex project with many components.

MCC's project selection criteria was anchored on sub-projects that were technically sound, to yield an economic rate of return of 10 per cent if it could be implemented within five years and were sustainable in the long term.

MCC supported the development of investment plans for water supply and sanitation covering Lusaka Province and a priority drainage investment plan for flood prone areas in the city of Lusaka.

This was the frame-work under which the proposed investments in the LWSSD

infrastructure development would take place.

According to the Millennium Challenge Account-Zambia website, the investment plans under the LWSSD project have a 25 year design horizon through to 2035.



The interventions are divided into short-term, medium term and long term projects. Short-term projects are priorities up to 2015 while the long-term projects would extend up to 2035.

Zambia's ambassador to the US Sheila Siwela said the signing of the Compact facility was very exciting news.

This, she said, was indeed a joyous move and a manifestation of the US government's approval of Zambia's policies.

She said," It is my hope that more collaborations of similar nature will be forth-coming to Zambia. I am proud that Zambia is a recipient of this funding," she said.

In Lusaka, US ambassador to Zambia Mark Storella said his voice, "I congratulate the people and Government of Zambia for becoming one among a select group of countries to gain MCC approval for the compact partnership.

Reliable water sanitation and drainage systems were vital components for sustainable development and while mostly underground and largely invisible to the casual observer, would improve the health of Zambians, catalyse economic growth and continue to reduce poverty.

Mr Storella concluded," Together, we have engaged with multiple stake-holders in intensive negotiations, consultations and project development to achieve the five year \$354 million Compact agreement with Zambia.

It is therefore, not surprising that a cross section of residents in Lusaka recently shared their thoughts on the impact of improved water supply, sanitation and drainage and reflected on how it affected their lives in the **Millennium Challenge Account – Zambia** quarterly magazine for February – April 2012 as follows: "I live in an area where intermittently we have sewer blockages.

"Perhaps the system has outlived its design period. I look at the improvements in residential housing in Lusaka; there are more people residing on single plots, which possibly implies that the system needs to be upgraded.

"Residential houses are wall-fenced without the control of storm run-off, and that is one of the causes of occasional flooding in the city.

"There are some well-planned areas that are not connected to the sewer network. "The impact of that is that in the long-term we will damage our ground-water sources.

"We have good limestone aquifers in Lusaka, and if we contaminate these aquifers we are likely to disturb the potential source of water, which is ground water," said Humble Sibooli who was technical support manager at Water Aid Zambia.

Social economist at Zulu Burrow, Muze Balasi noted,"I might be privileged to have running water and a good sewer system but not all of my family members are as privileged as I. I've been to most of the peri-urban areas of Lusaka, and the problem of flooding was unimaginable.



The Government is doing the best they can but the efforts need to be doubled, even tripled.

In fact, we should all double our efforts, in our own fields, and I think we can all play apart in educating people – educating people about hygiene and sanitation. We can do a lot by educating people because that is where it starts."

Maria Akani, a registrar at Chainama Hospital observed, "There are many diseases that people can contract from water, even things like Hepatitis C, and many people don't know that.

"In Zambia, one thing that affects child health are diarrhoeal diseases because they compromise the nutrition of the child and it's difficult to control; their condition is made worse because of diarrhoeal diseases.

"In places where there is not good water supply or sanitation, where there are no proper toilets, it's a big challenge for the health sector, and we are still struggling with high infant mortality rates and child deaths. As a health professional, I know if we can deal with water – generally – we will be able to overcome a lot of challenges," Dr Akani said.

National Water Supply and Sanitation Council (NWASCO) director, Kelvin Chitumbo was quoted as saying, " the situation is one where every person who builds a house puts up their own septic tank, whereas we should have a situation where most of the areas are connected to the main sewer system.

"But we also have a situation where there has not been enough coordination between the planning authorities and the service provider to an extent where people have built houses and then they go to the utility company for services; it should be the other way around.

"With a project such as this, I hope it will enhance coordination, enhance planning and service delivery and establish strong links between stakeholders that provide services. We should strengthen that cord."

George Ndongwe, managing director, Lusaka Water and Sewerage Company said,"If there were improved water supply, it would relieve us as a utility company.

"At the moment, we spend most of our time grappling with inadequate water supplies for our people (customers).

"If it were improved, we might have more time to spend giving better service to customers, making their experience more pleasant.

On a personal note, I get affected when I see that people have died on account of not having access to a good water supply; it's unnecessary suffering, it shouldn't happen."

With the afore said, access to water, sanitation and hygiene will certainly improve the livelihoods and well-being of the general populace of Lusaka urban and per urban residents.



Clean water and adequate sanitation would lead to improvements in health, school attendance, productivity and entrepreneurship.

"Compact water project to improve sanitation in Lusaka", 30/04/2012, online at: http://www.times.co.zm/?p=7237

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✤ Dams 'fail to meet irrigation needs'

Group fears Mae Wong project will repeat errors made in other provinces

An environmental watchdog agency yesterday revealed that a major dam in Uthai Thani province has been unable to deliver sufficient water to farmers during the 10 years it has been in operation.

The amount of retained water in Tab Salao Dam, located on the Sakhaekrang River, is currently only 27 per cent of its capacity of 198 million cubic metres, said Adisak Janthawichanuwongse, secretary-general of the northern region's Environmental Board.

According to Royal Irrigation Department records, the amount of retained water in the dam last month was 40 million cubic metres.

Established a decade ago, the dam was only able to retain the maximum amount of water in its first year of operation. This has never been repeated, even in the rainy season, he said.

"It is a government mistake in water management, in that the dam has never been able to deliver enough water to farmers' lands," he added.

Sanong Khankankhay, a 59-year-old Uthai Thani farmer, said there was not enough water from Tab Salao Dam to irrigate her 5-rai cassava farm.

"We use only rainwater for our farms, which is not enough," she said while fishing with her husband at the base of the dam.

There is relatively little water flow into Tab Salao Dam because it is located in a rain shadow, a dry area on the lee side of a mountainous area, which blocks the passage of rain-producing weather systems and casts a shadow of dryness behind them.

A similar example of inefficient dam-water management is Nakhon Sawan's Klong Poh Dam, which has also failed to retain its full capacity since it was installed last year, he said.

The dam has a maximum retention area of 1,500 rai, but at present only 500 rai is covered by retained water.

Adisak said the two dams were prime examples of the uselessness of some dams for agricultural purposes.

He was speaking while leading a tour of media representatives to survey forested areas that might be affected by the construction of Mae Wong Dam in Nakhon Sawan. The project has been initiated by the Royal Irrigation Department to prevent flooding.



The plan to construct the dam was approved by the government, despite the environmental impact assessment report being rejected by the National Environmental Board.

The construction site of Mae Wong Dam is expected to be at the heart of Mae Wong National Park, in which wild tigers have recently been found.

Adisak is worried that if the government goes ahead with the project, there will be little or no water flowing into the dam, as has happened at Tab Salao and Klong Poh.

Meanwhile, National Parks, Wildlife and Plant Conservation Department director-general Damrong Phidej said he would visit the proposed construction site in Mae Wong National Park before deciding whether to ask the government to cancel the plan.

"I do not know the exact location of the site of the dam. I did not even know that the dam would be built at the heart of a national park, and that is why I need to see the area for myself," he told The Nation.

"Dams 'fail to meet irrigation needs", 02/05/2012, online at: <u>http://www.nationmultimedia.com/national/Dams-fail-to-meet-irrigation-needs-30181088.html</u>

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Educational Institutions And Industry Collaborate To Tackle Regional Water Crisis Heriot-Watt University Partners with UAE-based EPIC Green Solutions to Explore Sustainable Solutions

The Middle East is becoming increasingly focused on advanced conservation methods to deal with an inevitable water scarcity crisis. As a result, educational bodies and industry leaders are currently taking the necessary steps to utilise shared resources.

In a bid to provide students with a 360 degree educational process and encourage further innovation in the field, leading UK Educational institution, Heriot-Watt University (HWU) announced today a partnership with EPIC Green Solutions – a <u>UAE</u>-based international water management solutions company specialising in highly-efficient irrigation and drainage systems.

"While our students have the tools to master the theory aspect of the course within the class room, it is vital to provide them with industry experience," says Dr. Olisanwendu Ogwuda, Academic Head & Director of Studies at HWU's School of the Built Environment, "It is through collaborative efforts with companies such as EPIC Green Solutions, that we are able to bring reality into the classroom and allow students to apply their knowledge – an essential component of their education."

Launched in September 2011, HWU's water resources programme – part of the Dubai Campus' School of the Built Environment –aims to address the increasingly prevalent water shortage problem in the region. The programmehas already proven to be highly popular with students within the faculty, providing both taught and research modules that cover topic across the board from drainage and water treatment, to conservation and irrigation.

"It is important to take a two-pronged approach to a programme of this nature, combining both theory and practical application in order to help achieve a holistic understanding of the issue at hand," adds Dr. Ogwuda.

Over the last two months, in addition to providing guest lectures to HWU students, EPIC Green Solutions has facilitated a site visit to their demonstration plot installed on Yas Island in <u>Abu Dhabi</u>. Here, students were shown how the Environmental Passive Integrated Chamber(EPIC) system can save 50-80% more water than traditional irrigation systems. As a result, many HWU students have requested the opportunity to further study the EPIC technology as part of their final research projects.

Bart Rehbein, Managing Director of EPIC Green Solutions, commented on the importance of targeting the youth as a means of discovering and implementing sustainable solutions for the future.

"We recognise that these are the great minds of tomorrow, who will potentially be the key players delivering viable solutions to alleviate the current water shortage problem, both in the Middle East



and across the globe. By joining forces with Universities in the region, we have the opportunity to contribute to this evolution by providing a practical means of carrying out relevant tests that go beyond what is available to them in the lecture room. We hope this will further encourage other businesses within the industry to take similar action."

"Educational Institutions And Industry Collaborate To Tackle Regional Water Crisis Heriot-Watt University Partners with UAE-based EPIC Green Solutions to Explore Sustainable Solutions", 06/05/2012, online at: <u>http://www.middleeastevents.com/site/pres_dtls.asp?pid=15429</u>

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