

ORSAM WATER BULLETIN

Weekly Bulletin by ORSAM Water Research Programme

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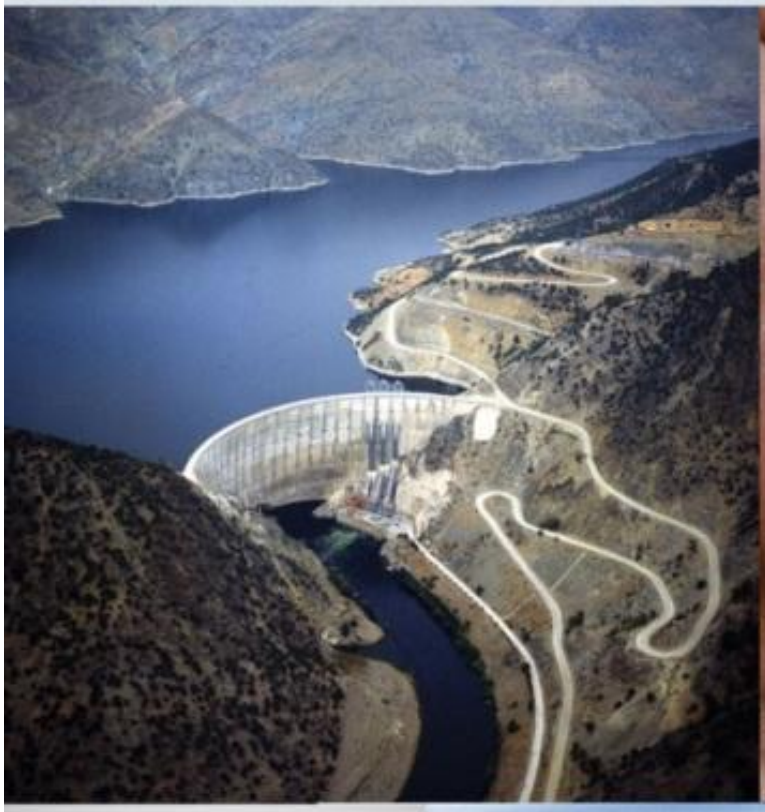



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❖ South East Europe Builds Resilience to Natural Hazards

A new cross-border multi-hazard early warning system will be developed in the Western Balkans and Turkey to increase resilience to floods, landslides, droughts and heat-waves which often hit the region and to build on the lessons learnt from the devastating floods of May 2014.

Authorities from Albania, Bosnia and Herzegovina, Croatia, Montenegro, Serbia, the former Yugoslav Republic of Macedonia, Turkey, and Kosovo agreed to establish a region-wide approach to build resilience to disasters and climate change adaptation at the conclusion of a two-year project implemented by the United Nations in collaboration with national counterparts and suppported by the European Union.

The overall project "Building Resilience to Disasters in Western Balkans and Turkey" came to a close on 20 October. It was co-financed by the European Commission through the Instrument for Pre-accession Assistance and implemented by the United Nations Office for Disaster Risk Reduction (UNISDR) and the World Meteorological Organization (WMO). It brought together different stakeholders from local, national and regional governments, as well as from the scientific and the private sectors.

At a concluding meeting in Ankara, Turkey, representatives of all the beneficiary countries agreed to continue cross-border cooperation and information sharing. They also fully supported work towards a regional multi-hazard early warning system, which will consist of harmonized and strengthened existing national systems.

The value of such cooperation was underlined last May when devastating floods hit several countries in the region. The economic losses of the floods have been signficant and have set back countries development gains.,The Ankara meeting highlighted several lessons learnt including better appreciation of the life-saving role of effective early warnings systems, and the necessity to increase investments in disaster prevention was also raised.

Boyan Kostic from the Ministry of Interior of the Republic of Serbia, noted: "The project proved to be highly useful. After the floods last spring, we fully appreciate that regional approach to flood management is to be fostered."

"The collaboration and achievements of the project have been remarkable," said head of the UNISDR Regional Office for Europe, Paola Albrito. "South East European countries are committed and aware of the challenges ahead. The engagement voiced on local action, exchange of knowledge, common data standards and the continuation of innovative insurance and reinsurance solutions sets the agenda for future collaboration."

"Effective early warnings helped limit the loss of life from the exceptional spring floods in the Western Balkans, but it will take years for the worst-affected areas to recover from the impact," said Dimitar Ivanov, who was responsible for the project as WMO Europe Representative. "We expect an increase in extreme precipitation events, as well as heatwaves, as a result of climate change. It is therefore vital that we do more to build cross-border disaster resilience."

One of the achievements of the project was the so-called KMS – an information and knowledge management system. As the May floodwaters surged across national frontiers, the system provided a platform for information exchange from the local to the national and international levels, which allowed integration between different national languages.

The disaster risk management capacity in the beneficiary countries was also strengthened due to the Exchange of Experts Programme,. This resulted in the building and strengthening of a network, which has been instrumental in supporting the affected countries in terms of information management as well as facilitating the procedure for bilateral and European international assistance.

The project boosted the number of cities from the region in the UNISDR Making Cities Resilient Campaign to 100, including from Montenegro and Kosovo, project beneficiaries that are new to the Campaign.

National meteorological and hydrological services (NMHS) in the region strengthened their capacity to improve monitoring and forecasting of extreme weather. Together with partners from the region, WMO and UNISDR organized training events and procured equipment and software for meteorological and hydrological data management to help speed the integration of the beneficiaries into the wider European Meteorological Infrastructure.

The project boosted technical capacity for flood and drought risk assessment across vulnerable sectors like agriculture and water, and promote integrated flood management as well as forecasting.

The South-East European Climate Outlook Forum, which prepares seasonal weather outlooks to help in disaster risk reduction, as well as agriculture, water and energy management, received support as a result of the EU funding.

As part of these efforts, Bosnia and Herzegovina in February 2014 joined MeteoAlarm, which provides comprehensive and coherent weather warnings across Europe through the www.meteoalarm.eu site. The platform enabled authorities to improve weather alerts in Bosnia and Herzegovina – as evidenced during the May floods - as well as contributing to the overview of severe weather events across Europe.

"South East Europe Builds Resilience to Natural Hazards",27/10/2014, online at: http://www.wmo.int/pages/mediacentre/news/SouthEastEuropeBuildsResiliencetoNaturalHazards.html

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❖ Iran Faces Drinking Water Shortage

Iran has been going through a severe crisis in sectoral use of water (drinking, irrigation, industrial) for a long period of time. The main causes of which are drought (the worst in 60 years); population growth; rural-urban migration; urbanization; rising urbanization; and mismanagement of water resources. According to the Global Trends 2030 Report, Iran will have been heavily dependent on fossil and imported water by 2030.

FAO indicates that in Iran, which is located in one of the most arid and semi arid regions of the world, the average annual precipitation is 252 mm, which is equal to approximately one-third of the world average. However, due to the climate change, the aforesaid value has decreased by 10 percent. In addition to , population growth and rural depopulation also affect overexploitation of water resources. Whilst the structure of population in pre-revolutionary Iran was that 40 percent of people lived in urban, and 60 percent in rural zones. The trend was reversed in the post-revolutionary Iran. Besides, the overpopulated regions are different from the water-rich regions in the country. For instance, while the population is dense in the Central Province of Iran, the water resources are mainly located in western Iran where the basin of the Persian Gulf and the Amman Sea are situated. Iran strived to solve the water shortage prevailing in overpopulated regions through inter-basin water transfer, which was considered a reasonable solution at that time. However, Iran which had been transferring inter-basin water resources for some 30 years did not take into consideration the current water shortage that prevails in donor – receiving basins. Today, Iran which has been trying to find a solution to the water shortage through inter-basin water transfer method, is facing water issues in its provinces.

In Iran, 92 percent of the water resources is used for irrigation, and conventional irrigation methods employed in some 80 percent of agricultural lands in the country cause a great deal of water loss. The amount of water loss in agricultural field of Iran is at the rate of 70 percent. This appears as a problem aggravating the current water shortage.

President Hassan Rouhani in his address at the Climate Summit held in New York in September 24th, 2014 voiced the global concern on climate change and underlined the importance of acting in unison to fight against this global problem. As much as the negative impact of climate change on water shortage cannot be denied; it is obvious that also mismanagement and utilization of water resources

constitute great problems in the country. Recently, the daily per capita use of water in Iran, where people have been going through water shortages in metropolitan cities such as Tehran and Isfahan, consumption of water is more than 350 liters per capita per day When compared to other countries in the world; the average daily per-capita water use in the EU countries is 250 liters; while it is some 450 liters in the US. In Iran, which is located in a water-scarce region, public awareness is essential to conserve water and and for better utilization of water resources. The Tor dam reservoir which provides Tehran (using 25 percent of Iran's drinking water) with water resources has dried out.

President Rouhani addressed the aforesaid issue both before and after being elected as the President of Iran. Also, he suggested in October 2013 after becoming the President that a new approach regarding the management of water resources must be adopted; and emphasized that national will is essential to solve the water problem. Despite the idea that a new approach is to be adopted regarding the management of water resources, Iran has currently been trying to overcome the aforesaid problem through temporary solutions. Carrying on inter-basin water transfer, Iran is striving to find a solution to the water shortage in the Central Province through desalination of the Caspian sea water and it is planning a project envisaging water transfer from Tajikistan. The aforementioned methods aim to solve periodical problems and put off a major problem. Developing long-term projects is essential for sustainable and effective management of water resources.

Being an efficient method in respect to effective water use at a rate of 90 percent, modern irrigation techniques must be employed in the agricultural sector, which uses more water than any other sector, as soon as possible. New regulations regarding the pricing, and water awareness projects should be introduced for effective use of water. International organizations have been developing projects to overcome water shortage in Iran who ranks as the 24th most water-stressed nation in the world. Most recently, FAO has come up with a project for Iran. With the implementation of the plan aiming at restoring water resources in Iran, it is envisaged that water resources will improve in short term.

"Iran Faces Drinking Water Shortage", Tuğba Evrim Maden, ORSAM, 31/10/2014, online at: http://www.orsam.org.tr/en/WaterResources/showAnalysisAgenda.aspx?ID=2724

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❖ Ban Ki-moon Urges World Community to Protect Disappearing Aral Sea

MOSCOW, October 29 (RIA Novosti) – UN Secretary-General Ban Ki-moon has urged the international community to contribute to the protection of the Aral Sea and prevent it from disappearing, in a video message at a conference in Urgench, Uzbekistan.

"Today, the Aral Sea is on the verge of disappearing entirely. This loss would affect millions of people in Uzbekistan and beyond …I call for intensifying the international response to this disaster," Ban Ki-moon said Tuesday at the International Conference on the Implementation of Regional Projects in the Aral Sea Basin, held on October 28-29.

According to Ban Ki-moon, "the root of the problem is poor water management", and a possible solution to the issue is "more efficient local water use".

Until 1960, the Aral Sea was one of the largest bodies of water in the world. However, the diversion of the Aral`s main water sources, the Amu and Syr Darya rivers, and their wide use in local industry have caused the sea to dry up. Over the last 50 years, the Aral Sea's surface area has shrunk to an eighth of its original size and the absolute water level in the sea has gone down from 53 m (173 ft) to 29 m (95 ft), according to the International Fund for Saving the Aral Sea.

The UN Secretary General also underscored the importance of regional and international cooperation "to manage trans-boundary waters fairly", adding that "no single country can respond to the Aral Sea tragedy".

In the video message, Ban Ki-moon stated that the United Nations supports the International Fund for Saving the Aral Sea (IFAS) and stressed that "many UN agencies, including our Regional Centre for Preventive Diplomacy for Central Asia, are working together to improve livelihoods, boost development and reduce health and environmental risks in the most affected [sea] areas".

The IFAS was established in 1993 following a decision by the countries affected by the shrinking sea, such as Uzbekistan, Kazakhstan, Tajikistan, Turkmenistan, and Kyrgyzstan. The IFAS is aimed at financing perspective programs and projects to save and rehabilitate the ecology of the Aral Sea region and the Aral Sea Basin.

"Ban Ki-moon Urges World Community to Protect Disappearing Aral Sea", 29/10/2014, online at: http://en.ria.ru/world/20141029/194784898/Ban-Ki-moon-Urges-World-Community-to-Protect-Disappearing-Aral.html

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❖ Precipitation helps Lake Urmia water level rising

By Fatih Karimov – Trend: Water level in Iran's Lake Urmia, which is experiencing its worst drought in many years, has increased by 29 centimeters thanks to recent rainfall.

Morteza Mousavi, the director general of the bureau for Lake Urmia water resources management, said thanks to more than 117 millimeters of rain during the previous calendar month of Mehr (September 23-October 22), the level of water in Lake Urmia is rising, Iran's IRIB reported on Oct. 27.

The level of water in Lake Urmia increased to 1270.44 meters on Oct.22, he noted.

It is hoped that Lake Urmia's water level would reach its ecologic level of 1274.1 meters through improving irrigation methods and implementing water transfer plans by 2023, he said.

Lake Urmia is in northwest Iran. Over 70 percent of its water has dried up. The level has been declining since 1995.

The situation over the Lake Urmia has been widely debated by the Iranian officials and experts.

Kioumars Daneshjou, head of the Water Resources Department of West Azerbaijan province said on Sept. 8 that the administration allocated 3.7 billion rials (about $139 million based on official rate of 26,600 rials per each USD) to implement projects aimed at revival of Lake Urmia for current fiscal year started on March 21.

He added that the allocated money will be used to finance an 18-article reviving plan by the energy ministry.

Daneshjou went on to add that the revival plan includes steps such as dredging the rivers flowing into the lake, water transfer from other catchments, management of groundwater resources as well as promoting optimal and efficient water consumption.

Meanwhile, Iran's Environmental Protection Organization, Masoumeh Ebtekar has said that the Organization does not agree with the plan of transferring water from Caspian Sea or Aras River to Lake Urmia, saying these plans are unprofessional due to economic and environmental factors.

Commenting on the issue, Iranian environmentalist, Professor Esmail Kahrom said it is very difficult, because Caspian Sea is in the lower plain, and not on the same level as Lake Urmia.

He said the altitude of Caspian Sea in some areas is about 21 meters below the level of the sea waters and oceans, but the Lake Urmia is almost 850 meters above the Caspian Sea, therefore Iran has to spend more money and energy to transfer the water.

Officials have said if the current restoration efforts are not effective, the lake will be turned into a swamp within four years. Previous reports said Lake Urmia needs 3.1 billion cubic meters of water per year to survive.

Iranian President Hassan Rouhani has established a working group to tackle the issue of saving Lake Urmia.

"Precipitation helps Lake Urmia water level rising", 27/10/2014, online at: http://en.trend.az/iran/society/2326689.html

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❖ Iran to export water, electricity to Iraq

Iranian companies are currently exporting over $1.320bn worth of water and power technical services to Iraq; the Baghdad government, however, has asked for an increase in the volume of water and power trade between the two countries.

Bahram Nezam ol-Molki, Director of Export Development and Technical Services in the Ministry of Energy of Iran, noted that certain agreements were reached on increasing the number of Iranian contractors in Iraq and said, "from now on, instead of European commodities, Iranian contractors are to use standard high-quality domestically-manufactured parts in Iraq's power, water and wastewater industry."

This official asserted that the increase in the number of Iranian companies in Iraq's water and electricity projects will meet the needs of this country and said, "in addition to civil cooperation, the cooperation between Iraqi and Iranian companies will also lead to an exchange of scientific knowledge and transfer of technical experiences."

During this meeting, Iraqi Minister of Water Resources was invited to visit Iran's International Water Exhibition which will take place in Tehran on November 17-18, and to get introduced to the latest achievements of Iranian companies in water and sewerage.

Minister of Water Resources Mohsen Al-Shammari stressed, "for the next four years, Iraq's water resources will need a $1.1bn investment which needs cooperation of Iranian companies more than before. We are also hoping to enjoy the experiences of Iranian companies in our dam constructions."

"Iran to export water, electricity to Iraq", 26/10/2014, online at: http://en.mehrnews.com/detail/News/104436

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❖ Iran implementing water, electricity projects in Iraq worth over $1.3B

Iranian companies are implementing 31 water and electricity projects in Iraq, worth over $1.3 billion, Bahram Nezamolmolki, an Iranian Energy Ministry official, said.

Nezamolmolki said just two projects, worth $30 million, are being implemented in Iraq by Iraqi companies, Iran's IRIB reported on October 24.

He said it is expected that more Iranian companies will invest in water and electricity projects in Iraq in the future.

Iranian ambassador to Iraq Hassan Danayeefar said in April that Iran exports 80 percent of its technical and engineering services to Iraq.
He said at the time that Iraqi market is capable to absorb $500 billion worth of investment in the technical and engineering sector.

The year 2013 registered high levels of commercial exchange between Iraq and Iran, which reached - according to both Iraqi and Iranian officials - more than $12 billion.

"Iran implementing water, electricity projects in Iraq worth over $1.3B",25/10/2014, online at: https://www.zawya.com/story/Iran_implementing_waterelectricity_projects_in_Iraq_worth_over_USD13b-ZAWYA20141026051022/

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❖ FAO to help Iran resolve water issue

During the ceremony of presenting his credentials as the official Representative of Food and Agriculture Organization of the United Nations (FAO) in Iran to the Minister of Agriculture of the country, Mr. Serge Nakouzi said, "for implementing international projects and developing cooperation with Iran, we require comprehensive programs. Given the capacity of Iran in the region, FAO is considering to shift its approach from project-oriented to program-oriented."

"This cooperation is not only limited to increase productivity, but it will also focus on sustainable development of certain activities such as organic agriculture, developing greenhouses and gardening," asserted he.

"Given Iran's prominent role in the region, FAO intends to aid Iran based on its capabilities and capacities in agriculture," he stressed.

He made the statement that if Iran follows FAO programs, the condition of its water suppies will greatly improve and that FAO does not only intend to help Iran but to spread its aid on a global scale.

"José Graziano da Silva, FAO Director General, is scheduled to visit Iran in 2015 in order to promote cooperation between Iran and FAO," Nakouzi maintained, "furthermore, he has a comprehensive program for the promotion of the FAO representation in Iran."

"FAO to help Iran resolve water issue", 25/10/2014, online at: http://en.mehrnews.com/detail/News/104426

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❖ Water as a tool for peace for Israel, Palestine and Jordan

A fascinating report published by Mumbai-based think tank Strategic Foresight Group (SFG), asserts that trans-boundary water cooperation directly correlates with regional stability and peace. The inverse also holds true: failure to collaborate when managing shared water resources raises the risk of war.

This premise was explored at a spirited conference held earlier this month at Oxford University, attended by prominent policy makers including former Cabinet Ministers from Palestine, Jordan and Israel. Prince Hassan bin Talal of Jordan sent the panelists a message urging consideration of water as a Regional Common in the Middle East, calling it "essential for improving the atmosphere in the region." Green Prophet also participated and we will bring you a series of reports on the problems and projects tabled at this important round-table of ideas.

Published in 2013, ***Water Cooperation for a Secure World – Focus on the Middle East*** defines water cooperation as an active commitment between riparian countries, underpinned by detailed action plans to be realized within agreed time-frames. This cooperation is formalized by legal agreements and entails joint management of decision-making, flood control, investment, and environmental protection. The SFG report concludes, "Any two countries engaged in active water cooperation do not go to war for any reason whatsoever." A tantalizing concept in this region ringed by civil unrest.

Water bodies do not respect political boundaries and are highly vulnerable to sociopolitical events such as over-development, populations shifts, lax environmental stewardship and war. Recognizing shared water resources as a regional commons and collaborating in prudent management could play a significant role in fostering peace and avoiding war.

According to SFG, of the 148 countries sharing water resources, 37 (many Middle Eastern) do not engage in active water cooperation and any two or more of those 37 face a risk of future war. In addition to exposing populations to water shortages, this also increases the likelihood that key water bodies will experience serious ecological decline due to mismanagement or exploitation.

Water cooperation is not only about human health and development, it is also about security of nations and wider civilization. Strong evidence correlates water cooperation to a general atmosphere of peaceful collaboration between nations, yet it is largely absent in the Middle East.

Jordan and Israel have a water cooperation agreement, which was revised in 2013 to enable a higher outflow of water from Lake Tiberius (Israel's largest freshwater lake) to the Lower Jordan River. These two nations also enjoy relative peace. By comparison, Israel has no agreements with Syria or Lebanon, and the water use in the Palestinian Territories is hotly disputed.

SFG convened this roundtable (against the volatile backdrop of Israel/Gaza conflict and civil war in Iraq and Syria) with a simple goal to kick-start communication between the parties and find specific ideas for a positiveforward movement. Three initiatives were identified representing immediate to long-term goals:

1. Commence Gaza reconstruction and development, inclusive of a) replacement of water supply systems destroyed during military confrontation and construction of a freshwater pipeline from Ashkelon to Gaza on an urgent basis; b) protection and restoration of the overburdened coastal aquifer and creation of a waste water treatment plan to mitigate increasing salinity and contamination of fresh water sources causing public health problems; and c) development of a sizable desalination plant taking advantage of its favorable geographic location to create a new water source for the long-term. Solicit agreement that future conflict will not target these facilities.

2. Restructure the existing Joint Water Commission, a trilateral commission between Israel, Palestine and Jordan for the sustainable management of shared water resources. An efficient functioning mechanism of resource management protects water resources in times of political discord and crisis, builds trust and contributes to wider confidence and cooperation.

3. Engage civil society and use the media as active participants in water conservation practices, and to raise awareness of water cooperation as a peace and confidence building measure.

Strategic Foresight Group expertly crafts new policy concepts that enable decision makers to prepare for a future in uncertain times. Founded in 2002 by Sundeep Waslekar, Ilmas Futehally and Shrikant Menjoge, their body of work includes over 30 research reports on the subjects of water diplomacy and peace, conflict and terrorism. In 2010, they began work on trans-boundary water issues and conceptualized the Blue Peace framework to transform water into an instrument of peace, security and cooperation in 2011. The following year, a High Level Group composed of former cabinet ministers from Turkey, Lebanon and Iraq, and chaired by Prince Hassan bin Talal, was created to steer the Blue Peace process in the Middle East.

"Water as a tool for peace for Israel, Palestine and Jordan", 27/10/2014, online at: http://www.greenprophet.com/2014/10/water-as-a-tool-for-peace-for-israel-palestine-and-jordan/

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❖ Rehabilitation of the Lower Jordan: Bringing the River Back to Life

An international conference on rehabilitating the Lower Jordan River was organized by organizations participating in the rehabilitation and development of the area that borders on Jordan.

Conference participants included the government ministers of national infrastructure and environmental protection, the KKL-JNF World Chairman, representatives from the UN, the EU and the Kingdom of Jordan, as well as scientists from Israel and other countries, and executives from various organizations involved in this field.

In order to understand the challenges of the Jordan River and its surrounding banks better, it is not enough to hear scholarly explanations. For this reason, the conference began with an excursion, so that the conference participants could see firsthand how rehabilitating the Jordan River could contribute to the environment, agriculture, tourism and relations between the neighboring countries of Israel and Jordan.

At the Old Gesher site, conference participants heard about tourism initiatives in Israel and in Jordan all along the Jordan River, and they were impressed by the historical bridges from the Roman period to the days of the British Mandate. At Yardena, they viewed the Jordanian side of the border, learned about the agriculture on both sides and heard about the cooperation between the two countries with regard to water and farming. They also heard a report on the mine clearing project being directed by the Israel Ministry of Defense, which aims to make the region accessible to the general public.

After the excursion, participants convened at the conference auditorium in Kibbutz Nir David, where there were lectures, discussions and panels during the two days of the conference (October 20 – 21).

"Rehabilitation of the Lower Jordan: Bringing the River Back to Life",02/11/2014, online at: http://www.jpost.com/Green-Israel/International-Cooperation/Rehabilitation-of-the-Lower-Jordan-Bringing-the-River-Back-to-Life-380562

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❖ Can Desalination Help Save a Holy River?

The Jordan River of the Middle East has supported a long succession of empires and other human settlements for more than 8,000 years, but it took less than one generation of modern civilization to reduce the river to a trickle of sewage.

Now, the ultra-modern technology of "desalination" — turning ocean water into fresh water – may provide the best hope for bringing the river back to life.

At least that appeared to be the implicit consensus I heard last week from the more than 400 Israeli and Jordanian water experts and interested stakeholders gathered in a kibbutz just downstream of the Sea of Galilee, in the Jordan River's watershed. While the river forms an international boundary that divides their countries, the river's advocates have come to realize that only by working together can they hope to bring the river back to some semblance of the sacred blue ribbon in the desert that once sustained Egyptian, Hittite, Assyrian, Israelite, Babylonian, Persian, Greek, Roman, Arab and Ottoman empires.

A River Betrayed

The once-mighty yet still-holy Jordan River has lost more than 90% of its natural water flow to thirsty farms and cities. The trickle of water still flowing down the lower Jordan channel into theDead Sea today is a fetid brew comprised mainly of raw sewage, fish pond waste, and agricultural runoff.

It seems an ungodly fate for a river immortalized in the holy books of Judaism, Christianity, and Islam, whose stories tell of the places where Jesus was baptized, four companions of the Prophet Mohammed were buried, and where Moses looked out onto the Promised Land.

Sadly, the primary river site in use today for baptizing more than a half million Christian pilgrims each year is located some 200 river kilometers upstream from where John the Baptist is believed to have baptized Jesus, due to two unfortunate realities: the biblical site is situated in a no-man's land along the international border that is largely off-limits to all but the military, and immersion in the

filthy river that now exists at the biblical site might leave a pilgrim relieved of sin but newly burdened with river-borne diseases.

The river's flow had been only lightly depleted until 1964, when Israel completed its 130-kilometer-long National Water Carrier, a canal and pipeline system that removes water at the Sea of Galilee and delivers it to Tel Aviv and other cities, power plants and industries along the country's Mediterranean coastline and to irrigated farms extending as far south as the Negev Desert. From 1969-2008, the NWC diverted an average of 329 million cubic meters (MCM) of water from the Jordan each year, amounting to more than a quarter of the river's total flow.

As the Israelis were building the National Water Carrier, Jordan was constructing a large water diversion of its own, the King Abdullah Canal, completed in 1966. The 110-km King Abdullah Canal takes an estimated 140 MCM of water from the Yarmouk River, the Jordan's largest tributary, to supply the capital of Amman as well as farms in the southern Jordan River valley. Because Syria withdraws virtually all of the remaining water available in the Yarmouk, this tributary no longer contributes much water flow to the Jordan River.

By the time the withered Jordan River reaches the Dead Sea, only a paltry fraction of its original water flow remains. With greatly-reduced inflow from the Jordan River and with huge losses to evaporation, the water level of the Dead Sea – the lowest and one of the hottest places on Earth, currently at 427 meters below sea level – has been dropping by a meter each year.

A Vision of River Renewal

Even while reinstatement of Palestine as a nation remains a searingly hot political potato in the region, leaders in the water and agricultural communities of the region have been able to reach across geopolitical borders and religions in search of equitable and sustainable ways of managing the region's scarce water resources. Last week's "International Conference on the Rehabilitation of the Lower Jordan River" brought together water and energy ministers and other dignitaries from Israel and Jordan and included participants from national agencies, the United Nations, the European Commission, conservation organizations, many universities, and local communities.

Many attendees expressed excitement about the tourism potential of the Jordan valley, even beyond its draw for religious pilgrimage. This is the valley walked by early *homo sapiens* when they migrated north out of Africa, following a route that is still used by a half-billion migrant birds of more than 300 different species each year. Cranes, eagles, buzzards, and sparrowhawks can be viewed in their annual migrations through the Jordan valley, along with a half-million White storks (*Ciconia ciconia*) that breed in Eurasia during summer and return to Eastern Africa for the winter.

The meeting last week was tightly focused on the 25-km stretch of the Jordan flowing downstream from the Sea of Galilee, as that section of the Jordan lies upstream of the politically troublesome West Bank. While aiming only at a short piece of the 200+ river kilometers that run from the Sea of Galilee to the Dead Sea may at first seem short-sighted, much of the depletion of the river's water flow takes place in this stretch due to the operations of the National Water Carrier and the King Abdullah Canal, meaning that any solutions to put water back into that 25-km segment could benefit the longer river downstream.

It is highly unlikely that Jordan will be able to return any water to the river in the foreseeable future, however. The nation is struggling mightily to provide water to two million recent immigrants seeking refuge from the Syrian conflicts, and doesn't have a drop to spare for the river.

Most participants at last week's conference therefore view Israel as being in the best position to make some water available for the river, but not without enormous challenges as well. Israel has already squeezed most of the water-saving potential out of its cities and farms. The country cut its agricultural water use in half over the past decade and is widely recognized as being the world's most efficient irrigator. Similarly, Israeli homes and businesses have for decades included low-flow toilets and showers and water-efficient washing machines, and they have avoided water-thirsty landscaping in their building plans. The Israelis have also been actively reusing water from their cities for agricultural purposes, thereby requiring less to be taken from the Jordan or other small streams along its western coast.

Desalination of ocean water may prove to be the only hope left to save the Jordan River. Israel has already built four desalination plants that provide more than 25% of the country's freshwater supply,

and has two more plants under construction. The additional water supply coming from desalination will hopefully enable the country to reduce its overdraft of groundwater aquifers, and maybe – just maybe – redirect some water back into the Jordan River. In fact, the Israeli Water Authority recently committed to reallocating 9 MCM of water from the National Water Carrier to bolster flow in the Jordan River downstream of the Sea of Galilee beginning in 2013, with plans to increase that flow restoration to 20 MCM in the near future.

Using desalination as a means for offsetting water that is presently taken from the Jordan comes at considerable expense, however, because the electricity required for desalination is very costly. As I discuss in my book Chasing Water, river restorationists usually rely on water conservation and improving irrigation efficiencies as the best means for returning water to rivers.

How Much Water Does the River Need?

The recent commitment to return 20 MCM of water to the Jordan has given the river's advocates new hope. But they know they have a very long way to go.

EcoPeace /Friends of the Earth – Middle East, an international conservation organization, recently commissioned comprehensive studies of the river's hydrology and water uses, including an assessment of how much water might be needed to "rehabilitate" the river's health (the FoEME report appropriately distinguishes rehabilitation as a process of bringing a river system back to a healthy and balanced ecological state, as contrasted with "restoration" of a river which implies returning to a natural condition). Assessing how much water a river needs to sustain its health is never easy, but the ecological assessment of the Jordan posed some rather extraordinary challenges. Dr. Sarig Gafny, who led the study, told me that his aquatic sampling required him to step only on the tops of boulders in the river, as he was afraid that if he stepped into the riverbed he might set off one of the thousands of landmines that have been placed along the contentious international border.
The FoEME environmental flow report suggests that somewhere between 400 and 600 MCM of water will need to be returned for river rehabilitation. That's at least 20 times more water than the Israeli Water Authority committed recently. It's hard to know where the rest might come from, and it's hard to imagine that it could all come from desalination.

But Alon Tal of Ben Gurion University put the cost of that water into perspective for the conference attendees. "Water presently costs Israelis about 60 cents per cubic meter. Producing 400 million cubic meters for the river would cost us about $240 million per year. But think about it: one B2 bomber costs two billion dollars. For the cost of one bomber every 8 years we could bring the river back to life."

Special thanks to Ambassador Ram Aviram, David Katz, and the Lower Jordan Rehabilitation Administration for inviting my participation in the Jordan River conference, and to Eco-Peace/ Friends of the Earth – Middle East for sharing their reports containing many of the statistics cited here.

"Can Desalination Help Save a Holy River?", 02/11/2014, online at:
http://voices.nationalgeographic.com/2014/11/02/can-desalination-help-save-a-holy-river/

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❖ Israel To Help California Combat Worst Drought In History Following Losses Of $2.2 Billion

The Israelis know a thing or two when it comes to managing dry arid lands, and making them flourish, even when the rains don't fall "in their time."

So when it came to getting some help for the poor farmers of California, who have suffered massive financial losses as a result of the dry weather, California Governor Jerry Brown contacted Israeli Prime Minister Benjamin Netanyahu and the two men signed a strategic cooperation agreement earlier this year as part of which Israel, a world leader in the field of water, would help out the arid state.

The droughts have already purportedly cost the state's economy a whopping $2.2 billion and has left more than 500,000 acres of fields fallow in its wake.

Being that California is the source for more than 50 percent of US fruit, vegetables and nuts, and almost 90 percent of America's strawberries, olives, broccoli, nectarines and garlic, it's vital that the state finds ways to cope with the rainless situation they are faced with.

As part of the Israeli efforts to come to its closest allies' aid, Prof. Eilon Adar, a world expert in groundwater flow systems, will work to help the state work out solutions to the issue.

During a recent visit to San Fransisco and the Silicon Valley, Professor Adar toured numerous salination plants in northern California, and participated in a state-wide conference in which a wide range of technological solutions were presented.

Adar said, "If we managed to overcome the water issues in the Middle East, we can do it anywhere in the world. Nonetheless, (to address the issue) they will need to improve the management and

efficiency of the water market and increase and optimize the coordination between the water companies."

At the same time, the Israeli consul to California, Andy David, said to reporters, "We are pushing ahead with the water issue and branding Israel as part of the solution, an ally with the knowhow whom can come to help in a time of need."

"Israel To Help California Combat Worst Drought In History Following Losses Of $2.2 Billion",29/10/2014, online at: http://www.inquisitr.com/1571036/israel-to-help-california-combat-worst-drought-in-history-following-losses-of-2-2-billion/

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❖ Dry California Welcomes Israeli Water Expert

The world-renowned hydrologist is touring East Bay water facilities with state and regional water experts, as part of a historic technology-sharing agreement signed last year by California Governor Edmund G. Brown Jr. and Israeli Prime Minister Benjamin Netanyahu.

"As an issue of national security, Israel has successfully made itself water independent," said California Natural Resources Agency Secretary John Laird. "With a similar climate, California is poised to benefit greatly from Prof. Adar and researchers at Ben-Gurion University of the Negev as we plan for ways to better manage water, particularly in times of severe drought."

Adar will be briefed on the activities of California's Delta Diablo Water Agency, which is turning bio-solids into energy, and about the Stanford University partnership with Delta Diablo's Recycled Water Technology Pilot.

"If we managed to overcome our water problems in Israel, in the Middle East, it can be done almost anywhere else in the world," Adar said. "However, in order to improve the water management and efficiency in California, the water utility companies need to increase their coordination and cooperation on water use and treatment."

The Zuckerberg Institute was founded in January 2002 in the Jacob Blaustein Institutes for Desert Research, at the university's Sde Boker campus. The Institutes unite under one roof all aspects of water resources research, including groundwater production, desalination technologies and treatments for marginal water sources.

Adar conducts cutting-edge research on groundwater flow systems and arid basins. His Mixing Cell Model (MCM) approach utilizing hydrochemistry and environmental isotopes coupled with a flow model has been applied in hydrological basins in Israel and worldwide, from the Kalahari Desert (Namibia) to the Ili basin in Kazakhstan.

"Dry California Welcomes Israeli Water Expert",31/10/2014, online at: http://www.shalomlife.com/health/26697/dry-california-welcomes-israeli-water-expert/

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❖ India-Israel agricultural cooperation: The down to earth way of combating child labor

Where foreign aid and regulations have failed; Israeli innovation in agriculture is addressing the issue of child labor in India at its roots. Hardworking and proud farming communities in India need right tools and technique to make agriculture gainful – not Western hand-outs.

The bestowal of this year's Nobel Peace Prize to Kailash Satyarthi left me as an Indian with a sense of pride and unease at the same time. Satyarthi is a worthy recipient of Nobel Prize for his lifelong struggle against child labor in India – an honor he shared with Pakistan's Malala Yousafzai.

If the global recognition of Satyarthi's efforts against child labor filled me with pride, it also reminded me of the grim reality faced by millions of children across India. With worldwide some 200 million children working under illegal and exploitative conditions, the problem of child labor may not be unique to India; but with estimated 60 million child laborers in India alone, makes it a pressing issue for India's lawmakers and society as a whole.

The phenomena of child labor is tied to India's traditional dependence on agriculture sector. Despite rapid industrialization and free-market reforms of past 2 decades, agriculture still employs 47% of the workforce, but contributes only 16% to the country's GDP. Small landed and landless farmers make the bulk of agriculture workforce. Agriculture sector is vastly unorganized and agriculture practices outdated. Farmers are often at the mercy of unpredictable monsoon rains for harvesting cash crops.

In these circumstances, a single failed crop is enough to cause existential threats to cash-strapped small farmers. Children are often send to work under exploitative and hazardous conditions to supplement family income or to settle farming debts.

No amount of foreign aid can fix the inherent deficiencies in India's agricultural production. Country's strict laws forbidding child labor have very little impact on the ground reality.

However, Israeli technology and innovation in field of agriculture has delivered where foreign aid

and legal regulation have failed. As Media is taken-in by glamorous billion dollar defense deals, bilateral cooperation in agriculture is more significant and transformative factor in the India-Israel relationship.

Israel's agriculture cooperation with India go back to 1960s, when India first began to modernize its agriculture sector under the slogan of "Green revolution".

India and Israel cemented this commitment in 2012 by formally agreeing on long-termagriculture action plan.

Presently, the plan is being implemented in 10 states in India. Under this plan both countries are collaborating in agriculture, dairy production, water management, and related sectors.

The new government in New Delhi recognizes Israel as a strong partner and means business when it talks about strengthening cooperation in the field of agriculture. India's Agriculture Minister Radha Mohan Singh recently called agriculture a "strong foundation for strengthening bilateral relations".

Yonatan Ben-Zaken, head of Israeli Economic Mission in India echos Minister Singh's assessment. According to Ben-Zaken, similarities in climatic conditions make Israeli Agri-Tech solutions and expertise a perfect match for India. In his assessment, implementing Israeli technology and know-how Indian farmer can improve production by 5 to 10 folds.

The center-piece of Israeli initiative are the Centres of Excellence (CoE) being developed at various locations in India. These CoEs showcase latest Israeli innovations in farming, horticulture and dairy sectors and act as training centers for local farmers in new technologies, know-how and techniques. By 2015 over 30 such centers are expected to be functional all across India.

An important aspect of bilateral cooperation is to increase participation of Israeli companies in India. Israel's Ambassador to India, Daniel Carmon recently raised the issue of increasing the role of Israeli private sector in dairy industry with India's Agriculture Minister Singh. According to media reports, Minister Singh assured Ambassador Carmon of "extending all possible cooperation" and pave the

way for more Public Private Partnerships (PPP) in dairy sector.

So far the most ambitious project of this dynamic relationship has been of bringing olive plantation to the western Indian state of Rajasthan. Initially over one hundred thousand saplings were flown in from Israel on the behest of Rajestan's Chief Minister Vasundhara Raje, the first women Chief minister of the state. In 2006 Chief Minister Raje sought Israeli cooperation after visiting an olive farm in a kibbutz in the Negev desert.

Today olive plantation cover 282 hectare land spread across Rajasthan. In October 2014 first olive refinery rolled into production near Bikaner city – a first of its kind in India.

Drip irrigation is having a considerable impact by improving yields, expanding arable land, reducing farming costs and saving the scares water resources. Israel's drip irrigation giant Netafim has put over a million acres of land in India under drip irrigation systems – benefiting some 325,000 farming families.

Netafim recently joined hands with Tamil Nadu Agriculture University to study the impact of drip-irrigation in conventional Indian crops like rice. Drip irrigation has also been introduced to increase Pomegranate yields.

Israeli technology is helping farmers reduce their over dependence on crops by supplementing their income with horticulture and dairy produce.

As right tools are handed to Indian farmers, they are carving their way out into prosperity by employing their improvisation and ingenuity.

Growing up poor in rural India, I am aware of the plight that young child and old face. I am not writing on these issues as an intellectual. I am talking about my community. I was fortunate that my parents could send me to a state-run school and I was able work my way through the college.

Showing pity or extending charity would be an insult to these hardworking children, who often

selflessly take the yoke of responsibilities on their tiny and tender shoulders to help their families – they simply deserve our respect.

As everyone focuses on high-profile India-Israel defense deals, away from the glare a quiet revolution marches on. As world media stumbles from one sensational conflict to another, Israel transforms the way millions of farming families in India cultivate and harvest.

"India-Israel agricultural cooperation: The down to earth way of combating child labor",27/10/2014, online at: http://www.jpost.com/Blogs/The-Indian-Dispatch/India-Israel-Agricultural-Cooperation-The-down-to-earth-way-of-combating-child-labour-379938

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❖ Water tariffs set to drop another 10% in 2015

Stabilization in the water sector has made reduction in tariffs possible.

After dropping 5% in 2014, water tariff rates are expected to fall another 10% on January 1, 2015, the Water Authority announced on Sunday.

"The stabilization of the water sector and the increase in regulatory demands of the Water Authority for streamlining all water suppliers formed the professional basis for a very substantial reduction in water tariffs for the second year in a row," said Water Authority Director Alexander Kushnir.

The Water Authority Council is expected to officially make the decision to implement January's 10% water tariff reduction at a meeting on Thursday.

In addition to these cuts, Kushnir said over the course of next year the Water Authority will consider further reductions, enacting the recommendations of the Balinkov Committee, which examined the economic regulations associated with the water sector.

Other changes will likely include the cancellation or reduction of high real-estate taxes on water facilities and the elimination of various subsidies, the commissioner added.

The 10% reduction for January is striking due to the increase in amounts of expensive desalinated water being used, indicating increased efficiency throughout the water sector, according to the Water Authority.

Reducing the costs across the industry has led to the ability to decrease domestic water consumption rates. Many local water corporations have managed to improve their water and sanitation infrastructure, and have succeeded in significantly reducing both water loss and operational costs, the authority said.

"We are working so that also next year, we will be able to advance conditions that will enable additional streamlining of all bodies in the water sector and will bring about additional reductions of consumer tariffs," Kushnir said. "As is known, the water sector succeeded this year in overcoming

the most extreme drought year in the modern history of the State of Israel and met all of its obligations."

"Water tariffs set to drop another 10% in 2015", Jerusalem Post, 26/11/2014, online at: http://www.jpost.com/Israel-News/Water-tariffs-set-to-drop-another-10-percent-in-2015-379872

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❖ Water rates may go down 10% next year

Water rates may go down 10% next year

Water Authority due to kick off the process this week, but strong interest group opposition may block the plan.

By Avi Bar-Eli | Oct. 27, 2014

The price of household water is due to drop by 10% at the start of next year, the Water Authority said on Sunday. The authority's governing board is due to discuss the planned reduction at a meeting on Thursday.

The move comes amid growing political pressure in recent weeks by the finance and national infrastructure minsters, as well as Knesset lawmakers, to rein in the authority's powers or even reverse the reforms of the water sector that saw municipal water works spun off into state-owned companies.

Nevertheless, the Water Authority still faces a tough political battle with interest groups that want to see the reductions implemented. To help preclude pressure, Sunday's announcement contained few details that would enable opponents to begin mounting campaigns against it.

The rate cut would be the second in a row, after a 5% reduction last January lowered the household rate to 8.80 shekels ($2.33) per cubic meter. The rate for heavy usage of more than seven cubic meters a month was reduced to 12.90 shekels a cubic meter from 14.30.

Nevertheless, it will only go part of the way to reversing the 40% increase in water rates between the time the reforms went into effect in 2010 and their record high in July 2013.

"After major investments amounting to billions of shekels, a stabilization of the water sector and a significant improvement of regulatory mechanisms, the trend is now reversing and water rates will be going down in a professional, considered and consistent way," said Alexander Kushner, director of the Water Authority and chairman of its board.

In fact, the reasons for the planned rate cut are more technical than anything connected with increased efficiency.

Up to four percentage points of the 10% cut will derive from planned reductions in the subsidies that industry and growers enjoy on their water rates. Another two to three points will come from the water companies, which will have to cut operating expenses, reduce the rate of depreciation they can incorporate into their rates and learn to live with a smaller return on their capital.

More savings on water will come from accounting measures that will on a technical basis reduce the price of high-cost desalinated water, even though the government is committed to buying 1.6 billion of the water next year, 400 million shekels-worth more than in 2014.

Under a 2009 agreement with the Manufacturers Association, the trade group that represents big industry, water rates for factories were supposed to gradually rise to the ordinary rate by 2015. That means the final rise of 4.5% will occur this January, which means there will be extra money available to help finance cuts for the public.

Amir Hayek, director of the association, declined to comment until he had seen the details of the Water Authority's plans. Nevertheless, he hinted the organization would oppose the cut. "It's true we signed an agreement, but the state of industry and its competitive ability have changed entirely since then," he told TheMarker.

Growers, which now pay a rate of 2.60 shekels a cubic meter, a third of the consumer rate, are also likely to fight the rate cut. They also agreed five years ago to a gradual rise in water rates over the years 2010 to 2017, but the two sides have fought over the pace of the rise. The Water Authority was to impose a sharp 12% increase in 2015, which would bring the rate to 3.20 a cubic meter. The growers will accept no more than 2.80.

Dubi Amitai, president of the Farmers Union, said a 12% increase would violate the spirit of the agreement. "It's very easy to say you want to lower the price of water for towns at the expense of farmers, but it doesn't work that way," he said. "You can't complain about the high cost of living and at the same time raise the cost of out inputs."

On the other hand, the municipal water companies are unlikely to put up a fight because they are already under heavy political pressure.

In spite of the lobbying the Water Authority can expect over the next several weeks, Kushner expressed confidence on Sunday that the proposed rate reduction would not only go through but would not be the last. "We are working to ensure that next year we have put into place conditions to make all parts of the water industry more efficient and enable us to make an additional tariff cut for the consumer," he said.

One way Kushner said he hopes to achieve that is through a planned cut in electricity rates in the first quarter of next year. The reduction of between 12% and 16% will reduce the energy costs involved in piping water and desalinating it. That alone could justify a cut in water rates of 3% to 4%, Kushner said.

"Water rates may go down 10% next year",27/10/2014, online at:
http://mideastenvironment.apps01.yorku.ca/2014/10/water-tariffs-set-to-drop-another-10-in-2015-jerusalem-post-haaretz/

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❖ Jordan world's second water-poorest country

Jordan Times- Jordan now ranks as the world's second water-poorest country, where water per capita is 88 per cent below the international water poverty line of 1,000 cubic meters annually, government officials said last Wednesday.

The deteriorating regional conditions and turmoil have led to waves of hundreds of thousands of refugees flowing into Jordan, pushing it over time from being one of the world's 10 water-poorest countries in the world, to the fourth and now the second, according to ranking by the United Nations, Ministry of Water and Irrigation Spokesperson Omar Salameh told The Jordan Times.

Meanwhile, Minister of Water and Irrigation Hazem Nasser said that Jordan has borne the burden of hundreds of thousands of Syrian refugees, stressing in a statement e-mailed to The Jordan Times that the influx of refugees caused water demand to increase by 40 per cent in the north, 10 per cent in Karak in the south and by more than 21 per cent of the Kingdom's average water demand.

The main challenge to the water sector, according to the report, is the increasing demand for water due to the ongoing influx of Syria refugees into the country. But Nasser said that the high energy prices also pose a key challenge to the ministry.

The available water resources in Jordan offer 800-900 million cubic meters of water annually, the minister noted, underscoring that this annual amount caters for the needs of only three million people, while the number of water users in Jordan now exceeds 10 million people.

"Jordan world's second water-poorest country", 27/10/2014, online at:
http://mideastenvironment.apps01.yorku.ca/2014/10/jordan-worlds-second-water-poorest-country-environment-and-development/

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❖ Project to increase water supply to Maan residents

AMMAN — The Water Ministry has started construction on a project to increase Maan Governorate's daily water share, a government official said ?Thursday.

Under the project, the ministry is drilling a well in Maan to pump around 1,000 cubic metres of water daily to increase the amount of water that consumers in Maan's outskirts receive, the ministry's spokesperson, Omar Salameh, said.

"Residents in several residential areas in Maan are suffering from water shortage. Therefore, the ministry will drill a well, install state-of-the-art sunken pumps and a pumping station to produce more than 40 cubic metres of water per hour," Salameh noted.

Construction on the project has already commenced, he said, noting that the project's agreement was signed this week.

"The project is being implemented by a local contracting company and will be completed within three months. Once completed, water supply in Maan will improve substantially," he said.

The project is funded by the Gulf grant, according to the ministry.

In 2011, the Gulf Cooperation Council allocated $5 billion to finance development projects in Jordan during the 2012-2016 period. The grant is divided between Saudi Arabia, Kuwait, the United Arab Emirates and Qatar, with each country paying $1.25 billion.

A list of development projects was prepared by a committee, with some $425.4 million of the grant allocated for water and sanitation projects.

Located 220 kilometres south of the capital, Maan Governorate's daily water per capita share stands at 80 litres per day, according to the ministry, which said that water loss due to deteriorating networks is affecting water supply to residents

"Project to increase water supply to Maan residents",27/10/2014, online at: http://mideastenvironment.apps01.yorku.ca/2014/10/project-to-increase-water-supply-to-maan-residents-jordan-times/

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❖ In Pictures: 'When we garden, we feel happy'

Syrian refugees at Zaatari camp turn to gardening to make a difference.
Rosie Thompson Last updated: 27 Oct 2014

In the midst of an expanse of dry land, thousands of Syrian refugees have been living in Zaatari Camp, Jordan, opened two years ago.

Some have turned to gardening to help them adapt to life in the camp and bring a bit of greenery to the desert landscape that has become their home.

Mohammad Abu Farah, who works at Save the Children youth centre in Zaatari Camp, is providing gardening and landscaping lessons to children in the camp as a form of informal education and psychosocial support.

"When the children arrived at the camp, they had just come from a violent war. Many of them were introverted and struggled in making friends. They were violent to one another," Farah said. "After we started implementing gardening classes, the children learned to work in a team, and started to build friendships."

"Gardening allowed them to make something with their hands, and gave them a sense of accomplishment. We have seen an incredible change in them."

Samar, 48, fled to Jordan with her husband and five children after two of her brothers-in-law were killed.

Zaatari camp has been home to her family for over two years. Prior to the war in Syria, Samar was a headmistress at a secondary school in Daraa and three of her daughters were attending university and studying engineering, architecture and physics.

They had a large house with a beautiful garden. Summers were spent cooking feasts with homegrown vegetables and sipping coffee under the shade of an olive tree.

"When we garden, we feel happy because there's something to do, such as watering the plants. It just makes you feel like there is life. Where we're from we're used to the view of greenery, here there's nothing, it's a desert," Samar said. "Even if we are to have little joys, they would make a great difference."

slideshow:

http://www.aljazeera.com/indepth/inpictures/2014/10/pictures-when-garden-feel-happ-20141027719595784 11.html

"In Pictures: 'When we garden, we feel happy"' ,Al Jazeera, 27/10/2014, online at: http://mideastenvironment.apps01.yorku.ca/2014/10/in-pictures-when-we-garden-we-feel-happy-al-jazeera/

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❖ Fears for Jordan refugee camp water lifeline

Without a sewage system in place, many fear the water which supplies most of Jordan will become polluted.
Last updated: 10 Oct 2014

video report:

http://www.aljazeera.com/video/middleeast/2014/10/fears-jordan-refugee-camp-water-lifeline-201410101116542412.html

Jordan is one of the three driest countries in the world, and a refugee camp for Syrians has been built haphazardly on one of the most important underground water aquifers in the country.

Now there are fears of the water becoming polluted.

Al Jazeera's Nisreen El-Shamayleh reports from Zaatari camp.

"Fears for Jordan refugee camp water lifeline" ,Al Jazeera, 27/10/2014, online at:
http://mideastenvironment.apps01.yorku.ca/2014/10/fears-for-jordan-refugee-camp-water-lifeline-al-jazeera-2/

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❖ Al Ain water expands production capacity by 60 per cent

New facility to produce 52 million cases of bottled water per year

Al Ain - In a bid to meet rising demand, Al Ain Food & Beverages (P.J.S.C), one of the largest bottled drinking water manufacturers in the UAE, has expandedits production for Al Ain Water . With the new facility, the capacity will increase from 32 million cases to 52 million cases of bottled water a year, thus boosting production by 60 per cent.

"The bottled water market is growing at an unprecedented scale across the Middle East region, and with UAErapidly progressing, our new, long-term manufacturing strategy is to constantly meet rising demand," says Fasahat Beg - Executive Vice President of Agthia Consumer Business Division. "We are a recognized leader in the market, and with Agthia making a total investment ofapproximately AED 90 million in this facility, we fully expect to increase our share of the domestic market and continue to consolidate our position."

Al Ain Water 's state-of-the-art production facility, is the first in the UAE and among the first in the region to receive the FSSC 22000 certification by LRQA. The FSSC 22000 is the latest Food Safety Standard based on the FSMS (Food Safety Management System) requirements and the PAS 220 (Publicly Available Specification).

The new bottling plant at the ISO 90001:22000:14000, OHSAS: 18000 certified Al Ain Food & Beverages factory boasts state-of-the-art machinery and one of the fastest and most highly utilized lines in the Middle East. The new High Speed Line from Krones, Germany produces about 72,000 bottles/hour which works out to approx. 1 carton/sec. The bottles and caps use approx. 30% less plastic than conventional bottles in the market thereby being easier on the environment.

Contemporary bottle design

As part of its new strategy, the company has also redesignedthe shape of the Al Ain Water bottle to suit the changing needs and preferences of its growing consumer base. The new lightweight bottle has been carefully engineered in response to consumer preferences for a contemporary and eco-friendly bottle with an 'easy to hold' shape. The innovative bottles and caps designsare more eco-

friendly using approx. 30% less PET and plastic in the bottle and cap, which reduces waste and makes it easier on the environment.

Reiterating the importance of striking the right balance, Fasahat adds, " Al Ain Water is a modern brand having broad acceptance and loyalty across segments inthe UAE's everchanging and diverse landscape."

New Marketing Campaign

The low gram, high quality, very consumer friendly bottle is being support by Al Ain Water 's new 'Keeps You Moving' campaign, which positions Al Ain Water as a brand with an attitude of uncompromising quality and heritage, making it 'your trusted companion'. It is the most balanced bottled water with an optimal composition of essential minerals your body requires to keep you moving.

ESMA Accreditation

Al Ain Water is among the first bottled water companies to receive the Emirates Quality Mark and its newly launched bottles already carry this quality mark. This accreditation is mandatory for all bottled water companies in the UAE. The accreditation augments Al Ain Water 's already high quality standards and is represented by several quality other awards including the 'Award of Appreciation' from SKEA (Sheikh Khalifa Excellence Award) and the Middle East Bottled Water Suppliers Excellence Award 2014 to name a few.

FSSC 22000 Accreditation

Al Ain Water 's state-of-the-art production facility, is the first in the UAE and among the first in the region to receive the FSSC 22000 certification by LRQA. The FSSC 22000 is the latest Food Safety Standard based on the FSMS (Food Safety Management System) requirements and the PAS 220 (Publicly Available Specification). It is fully recognized by the Global Food Safety Initiative (GFSI) and accreditation bodies around the world. The FSSC 22000 certification compliance, demonstrates that Al Ain Water has a robust system that meets customer and consumer requirements in Food Safety Management System. The factory is also ISO 90001:22000:14000 and OHSAS:18000 certified and uses fully automated manufacturing processes, that have been widely acknowledged as

one of the best in the region. The factory boasts a modern laboratory with the latest water-testing equipment and packaging material to ensure that products of the highest quality are manufactured.

Al Ain Water 's new bottle, is available in all leading retail outlets, and comes in 3 different formats - a 330ml bottle, a 500ml bottle and a 1.5litre bottle.

"Al Ain water expands production capacity by 60 per cent",28/10/2014, online at: https://www.zawya.com/story/Al_Ain_water_expands_production_capacity_by_60_per_cent-ZAWYA20141028133953/

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❖ 5th Edition of Waste Management Middle East Opens in Dubai

Endorsed by the Ministry of Environment and Water, waste management forum discusses the technological developments for better waste management

Initiatives are being taken to ensure a better waste management plan by both government and industry. During the recent Arab Environment Day, H.E. Dr. Rashid Ahmad bin Fahad, Minister of Environment and Water spoke of the role of technology and innovative solutions that will enable a sustainable environment, coinciding with the launch of the Carbon Footprint App by the Ministry.

Taking into account the vision for an eco-friendly and sustainable nation and with the theme of 'pushing for a greater environmental protection enforcement and accountability', the 5th Annual Waste Management Middle East Forum inaugurated yesterday at the Dusit Thani in Dubai, U.A.E. The forum is being endorsed by and held under the patronage of H.E. Dr. Rashid Ahmad Bin Fahad, Minister of Environment and Water, U.A.E. The event is also officially supported by the Dubai Municipality.

Inaugurating the event was Eng. Abdulmajeed Saifaie, Director of Waste Management from Dubai Municipality. Kicking off the first session was Dr. Udayan Banerjee who is the Environment Health and Safety Specialist at the Center of Waste Management - Abu Dhabi. Where Banerjee spoke about a product life-cycle and to think about waste management from initiation, H.E. Abdullah Al-Ali Al-Nuaim from the Arab Urban Development Institute elaborated on extracting resources like energy and fertilizers from disposed waste.

Pasi Lestelin of Valmet Corporation, a leading global developer and supplier of services and technologies for the pulp, paper and energy industries, spoke on the new technologies that create added value from biomass, waste and renewable fuels. He also presented a case-study on the Lahti Energy Ltd plant in Finland - a commercial waste gasification power plant. Bioelektra Group, a polish based company that is investing in municipal waste management, also addressed on an innovative solution for municipal solid waste processing with a 100% ecological effect. Both Valmet and Bioelektra Group are supporting the event as Waste to Energy and Technology Partners.

The first day also witnessed a number of case-studies. Where Dr. Taghreed Al Hashimi presented on Municipal Solid Waste - to - Biofuel Project of Masdar City, Sietse A. Agema of AEB Amsterdam addressed the delegation on the Amsterdam Waste Fired Power Plant - world's largest and most efficient waste combustion and steam turbine generation power plant. Attendees also heard from Dr. Kirstie McIntyre on HP's commitment to the circular economy: lessons from WEEE and Ahmed Gouda presented about the milestone of zero waste to landfill program by Unilever. Panel discussions also saw debates on the innovation in waste management sector and a sustainable approach to waste by creating value from waste.

Today, the second and final day of the event, will feature topics on waste reduction and the outlook for waste, moving forward. Attendees are scheduled to hear from Chairmen at the conference Dr. Mohammad Aref of Weatherford and Fareed Bushehri of UNEP who will speak on social campaigns and effective waste minimization strategies respectively. Covering topics on hazardous medical waste and safe management of health care waste will be experts from Ministry of Health - General Directorate of Health Affairs, Eastern Province Saudi Arabia and Abu Dhabi Health Services Company.

Speakers from Environment Agency Abu Dhabi, Supreme Council of Environment - Kingdom of Bahrain and ENOC will cover topics ranging from anaerobic treatment of waste water, community participation and waste minimisation through management practices. Panel discussions will also see debates on strategies and modern decisions in waste master planning.

Sponsors at the event were leading companies from the industry that included Teamtec, BLUBOX (Associate Sponsors) and Wastech Engineering (Exhibitor). The event also saw support from leading trade body The Chartered Institution of Wastes Management.

"5th Edition of Waste Management Middle East Opens in Dubai",28/10/2014, online at: http://www.zawya.com/story/5th_Edition_of_Waste_Management_Middle_East_Opens_in_Dubai-ZAWYA20141028111146/

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❖ Focus of the water sector in the GCC shifts towards sustainable practices

- H.E. Suhail Mohammed bin Faraj Al Mazrouei, UAE's Minister of Energy officially opened the conferences and exhibition with a formal ribbon cutting-

Abu Dhabi - The transition of the region's water sector towards sustainable practices was a focus of the 3rdWaterWorld Middle East (WWME) Conference and Exhibition, co-located with POWER-GEN Middle East (PGME), and recently held at the Abu Dhabi National Exhibition Centre.

Conference delegates, representing more than 40 countries, debated the challenges and solutions associated with water stability after reviewing a comprehensive white paper by Frost & Sullivan. The much anticipated white paper stated that, "ensuring water security for sustenance and growth has been a constant challenge for countries in the GCC. With increasing populations and growth in industrial and agricultural activities, pressure on the existing water resources is amplified. The focus of the water sector in the GCC is surely shifting towards sustainable practices, wastewater treatment, and recycling."

Addressing the potential of the marketplace, the white paper also stated, "Several utilities and water agencies are announcing noticeable projects, indicating the start of a technological turnaround. Governments of the countries in the GCC have allocated approximately $100 billion towards implementing better water technologies and energy-efficient desalination. The market for water and wastewater treatment equipment in the GCC is estimated to be USD $2.2 billion in 2014, and is expected to grow at a compound annual growth rate of 10.6 per cent up to 2020 to reach USD $4 billion."

"The WaterWorld Middle East (WWME) Conference and Exhibition returned to Abu Dhabi in recognition of the local leadership in water management," said Timm Dower, Event Director of WWME. "The calibre of exhibitors and speakers at this year's event demonstrates that Abu Dhabi is truly a hub for thought leadership in the water industries."

The Abu Dhabi Sewerage Services Company (ADSSC) was the event partner for WaterWorld Middle East conference and exhibition, with managing director Alan Thomson delivering one of the

keynote addresses followed by a technical presentation providing an update on the multi-billion dirham Strategic Tunnel Enhancement Programme (STEP) project.

"The Abu Dhabi Sewerage Services Company 's Strategic Tunnel Enhancement Programme (STEP) project is a great example of a solutions-driven project, and the delegates greatly benefited from the ability to tour the site," said Dower.

WaterWorld Middle East attracted speakers and exhibitors from 43 countries with 76.5 per cent coming from within the region with the remaining 23.5 per cent coming from Australasia, Europe, North and Latin America. The Conference featured 38 speakers in over 31 sessions.

Dr. CorradoSommariva, Managing Director, Generation Middle East, ILF Consulting and former President of the International Desalination Association (IDA), who participated in the Joint Plenary Session and chaired other sessions, was one of several industry leaders with prominent roles at the conference.

Marina Selivertova, Head of Russian Water Resources and Yuri Sharov, Director General, InterRAO Engineering, were part of a high-level delegation from the Ministry of Energy of the Russian Federation that involved several major Russian companies and business leaders. The delegation participated in the two-part "Russia Day".

The 4thWaterWorld Middle East Conference and Exhibition will be held in Abu Dhabi from 4-6 October 2015.

WaterWorld Middle East is owned and managed by PennWell Corporation.

"Focus of the water sector in the GCC shifts towards sustainable practices",28/10/2014, online at: https://www.zawya.com/story/Focus_of_the_water_sector_in_the_GCC_shifts_towards_sustainable_practices-ZAWYA20141028092442/

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❖ **Suez environnement at the heart of water issues in the Middle East with two new desalination and wastewater treatment contracts in Oman and UAE**

SUEZ ENVIRONNEMENT is to design, construct and operate the desalination plant at the new Mirfa Independent Water and Power Project in the Emirate of Abu Dhabi for a total amount of AED 677 million (€146 million).

Degrémont, a subsidiary of SUEZ ENVIRONNEMENT, was selected by Hyundai Engineering & Construction to build the reverse osmosis sea water desalination plant of the Mirfa Independent Water and Power Project (Mirfa IWPP) in the Emirate of Abu Dhabi. The Mirfa IWPP was awarded to GDF SUEZ by Abu Dhabi Water and Electricity Authority (ADWEA).

This project includes a contract totalling AED 544 million (€117 million) which covers the design and construction of a reverse osmosis sea water desalination plant with a daily capacity of 140,000 m3. It will be equipped with SeaDaf™ filtration technology to pre-treat the water from the Arabian Gulf, which is turbid and rich in algae, with a double reverse osmosis treatment for its desalination.

It will be followed by a second contract of seven years for the RO plant's operation and maintenance awarded to Degrémont by the Mirfa International Power & Water Company for a total amount of AED 133 million (€29 million).

Located 160 km west of Abu Dhabi, the Mirfa IWPP comprising the desalination plant will supply 240,000 m3/day of drinking water and 1,600 megawatts of electricity to respond to the region's growing demand for drinking water and electricity. The choice of reverse osmosis desalination appears to be a sustainable solution to the region's challenges with regard to water stress and conserving resources.

SUEZ ENVIRONNEMENT wins a contract in Oman to design, build and operate a wastewater treatment plant

Degrémont,in a consortium with Al-Ansari Trading Entreprise LLC, a local Oman civil engineering company, has been selected by the Oman water authority Haya Water to design and operate an 18,000 m3/day capacity wastewater treatment plant in Al-Amerat.

This contract, for a total amount of OMR 24 million (€50 million), in which Degrémont has a share of OMR 12 million (€25 million), has a two-year term for the operation and maintenance of the plant. Situated in Al-Amerat, a residential suburb of the capital city Muscat, the plant will use the UltraforTM membrane bio reactor process, which is appropriate for treating urban and industrial wastewater. Following treatment, this technology produces an effluent that can meet the most stringent water standards and allows the effluents to be recycled and reused in the most sensitive environments. The treated water in the Al-Amerat wastewater treatment plant will be used for irrigation.

"We are proud to have won these two new contracts in this region which must meet the dual challenge of demographic growth and protection of its water resources. They demonstrate our capacity to offer sustainable technological solutions in response to the challenge of local water stress challenges," commented Marie-Ange Debon, Deputy Chief Executive Officer in charge of the international division of SUEZ ENVIRONNEMENT.

These new contracts strengthen SUEZ ENVIRONNEMENT's position as a major player in wastewater treatment and desalination in the Middle East. Following the construction and operation of wastewater treatment plants such as As Samra (365,000 m3/day) and Wadi Ma'in (128,000 m3/day) in Jordan, Degrémont has in the past few years in Qatar completed the 4th extension of the Doha West wastewater treatment facility, as well as the plants in Barwa City and Lusail. As a global leader in reverse osmosis desalination, Degrémont has also built the desalination plants Fujeirah 1 (United Arab Emirates), Barka 2 (Oman) and Al Dur (Bahrain). More recently and in less than six months, Degrémont supplied and installed 33 modular desalination units for the treatment of brackish water in Riyadh (Saudi Arabia).

Degrémont

A subsidiary of the SUEZ ENVIRONNEMENT group, Degrémont has been the world water treatment specialist for local authorities and industrial companies for more than 70 years. Present in over 70 countries, the company has 5,000 employees and posted a revenue of €1.110 billion in 2013.

SUEZ ENVIRONNEMENT

Natural resources are not infinite. Every day, SUEZ ENVIRONNEMENT (Paris: SEV, Brussels: SEVB) and its subsidiaries deal with the challenge of protecting resources by providing innovative

solutions to industries and to millions of people. SUEZ ENVIRONNEMENT supplies drinking water to 92 million people, provides wastewater treatment services for 65 million people and collects the waste produced by 52 million people. SUEZ ENVIRONNEMENT has 79,550 employees and, with its presence on five continents, is a world leader exclusively dedicated to water and waste management services. SUEZ ENVIRONNEMENT generated total revenues of €14.6 billion in 2013.

"Suez environnement at the heart of water issues in the Middle East with two new desalination and wastewater treatment contracts in Oman and UAE",29/10/2014, online at: http://www.zawya.com/story/Suez_environnement_at_the_heart_of_water_issues_in_the_Middle_East_with_two_new_desalination_and_wastewater_treatment_contracts_in_Oman_and_UAE-ZAWYA20141029111341/

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❖ Liwa aquifer source polluted with nitrate ions, study reports

AJMAN: The Liwa Quaternary aquifer in the UAE has to be developed with extreme care because it is not receiving present-day recharge from rain, researcher from Ajman University of Science and Technology (AUST), said.

Prof Zeinelabidin Rizk, Dean, Institute of Environment, Water and Energy, representing AUST at in the 11th Gulf Water Conference held in Muscat last week, observed this while presenting a paper on this vital issue.

The conference was organised by the Water Science and Technology Association (WSTA), Bahrain in cooperation with the Ministry of Regional Municipalities and Water Resources in Sultanate of Oman.

Professor Zeinelabidin Rizk presented a paper entitled "Determining the Source of Nitrate Pollution of the Liwa Quaternary aquifer in the United Arab Emirates."

The paper's objectives aimed at defining the source(s) of groundwater pollution in the Liwa Quaternary aquifer with nitrate ion, and estimating the contribution of each source to the nitrate pollution problem in order to protect is important water resource.

Nitrate ion is known for being the most pervasive groundwater pollutant in agricultural areas all over the world, especially in the US, Europe and Australia, where groundwater pollution by nitrate ion results from excessive use of chemical fertilisers on farmlands, aquifer's nature and residential activities.

As Liwa is the most important agricultural area in the UAE, Prof Rizk used the results of field studies and chemical analyses conducted in the Food and Environment Control Centre of Abu Dhabi Municipality for groundwater samples, as well as the results of isotope analysis made in the Central Laboratories of the International Atomic Energy Agency (IAEA) in Vienna, Austria.

In his presentation, Prof Rizk indicated that the study area reached 21,624 square kilometres, 2.5 per cent of this area is used mainly for agricultural purposes, in low areas between giant sand dunes, and limited residential activities. The new and old farms represent 83 per cent of the total land use, while residential development utilises the remaining 17 per cent.

Prof Rizk, presented the hydrogeology and major-ions chemistry of the Liwa Quaternary aquifer in Liwa area, in the southern part of Abu Dhabi Emirate.

Unfortunately, the Liwa aquifer is unconfined and is in direct contact with surface pollution sources, which makes it susceptible to serious pollution. In addition, the groundwater level is only a few metres below the ground surface, particularly in agricultural areas.

Fresh groundwater in the Liwa Quaternary aquifer takes the form of a mound floating on the main saline water occupying most of the subsurface in the Western Region of Abu Dhabi Emirate. Professor Rizk divided the nitrate ion pollution sources into three: agricultural activities, the nature of the aquifer itself and residential development.

At the end of his presentation, Prof Rizk cautioned that the Liwa Quaternary aquifer has to be developed with extreme care because it is not receiving present-day recharge from rain because there is no observed water-level rise on continuous water-level recorders after rainfall events, low carbon-14 (14C) activity and almost lack of Tritium (3H) in the studied groundwater samples from the aquifer.
He recommended the usage of chemical fertilisers on farmland within the study area according to the amount the crops exactly need because excess chemical fertilisers pollute groundwater under farmlands. In addition the aquifer itself is free, directly connected to the land surface, and the groundwater table is only a few meters below the farms.

"Liwa aquifer source polluted with nitrate ions, study reports", 28/10/2014, online at: http://gulftoday.ae/portal/178a52b3-6ad8-4640-9624-a23c936d774f.aspx?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=a107e80c3b-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-a107e80c3b-250657169

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❖ Earth's Major Aquifers Are in Trouble

The world is perilously ignoring the water crisis that is occurring underfoot, writes Jay Famiglietti in the journal Nature Climate Change.

A professor of Earth system science at the University of California, Irvine, Famiglietti has helped refine the premier tool for understanding large-scale changes in groundwater reserves. Measurements from NASA's GRACE satellite mission, launched in 2002, have revealed unsettling trends in the world's major aquifers: they are almost all declining.

Sound management of new demands for water requires a better understanding of the supplies available, according to Famiglietti.

"Full appreciation of the importance of groundwater to the global water supply and security is essential for managing this global crisis, and for vastly improving management of all water resources for the generations to come," he writes in an article published online October 29.

Two billion people use aquifers as a primary drinking water source, and groundwater accounts for roughly one-third of the world's water withdrawals. The highest rates of groundwater depletion are in the world's largest food-growing regions: California's Central Valley, the Ogallala Aquifer of the American Great Plains, the plains of northern China andnorthwest India, as well as the Tigris and Euphrates River Basin.

The consequences of ignoring groundwater are severe, Famiglietti says. Because half of the water used for irrigation comes from underground, food production is at risk if water supply and demand are not balanced.

"Vanishing groundwater will translate into major declines in agricultural productivity and energy production, with the potential for skyrocketing food prices and profound economic and political ramifications," he claims.

Responses Are Available

To address the crisis, Famiglietti offers five steps that require immediate action:

1) Acknowledge that in many arid basins, demands far exceed supply. "The myth of limitless water and the free-for-all mentality that has pervaded groundwater use must now come to an end," he writes. To begin closing that chasm, he recommends starting with agriculture, which accounts for 80 percent of the world's water consumption, about half of which is from groundwater. Farmer's can be more efficient with the supplies they have, using irrigation technologies that require less water and land management practices that prevent soil moisture from evaporating.
2) Fill knowledge gaps. Though it is such an important resource, little is known about the actual volumes of water underground. Calculations often amount to back-of-the-envelope estimates. Measurement of groundwater pollution is also missing.
3) Manage rivers and aquifers as one system. Because the two are connected, rampant use of groundwater causes streams to run dry. Major rivers in the American Great Plains and Southwest are sandy channels where groundwater withdrawals are the highest. Conversely, too much water pulled from streams limits the water available to refill aquifers.
4) Measure, report, and share water data. Without measurement, attempts at management are rendered blind.
5) Put groundwater on the international political agenda. Water treaties between countries that share a river basin are common, Famiglietti notes. But treaties to define and divide groundwater resources are rare. The United Nations reckons that 448 aquiferscross political boundaries – a number that continues to rise as more studies are completed.

The consequences of inaction are stark, Famiglietti asserts.

"Further declines in groundwater availability may well trigger more civil uprising and international violent conflict in the already water-stressed regions of the world, and new conflict in others," he writes. "From North Africa to the Middle East to South Asia, regions where it is already common to drill over 2 km to reach groundwater, it is highly likely that disappearing groundwater could act as a flashpoint for conflict."

Scientists are ringing these alarm bells with greater frequency. A year ago the National Research Council, an arm of the most prestigious scientific body in the United States, argued that groundwater is a fraying safety net.

As reserves fall, society will find responding to droughts and shifting weather patterns all the more difficult. It is now up to the politicians and managers to heed the warnings.

"Earth's Major Aquifers Are in Trouble",30/10/2014, online at: http://www.circleofblue.org/waternews/2014/commentary/editorial-in-the-circle-fresh-focus/earths-major-aquifers-trouble/

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❖ Mystery of Earth's Water Origin Solved

Instead of arriving later by comet impact, Earth's waters have likely existed since our planet's birth

The water that makes Earth a majestic blue marble was here from the time of our planet's birth, according to a new study of ancient meteorites, scientists reported Thursday.

Where do the oceans come from? The study headed by Adam Sarafian of the Woods Hole Oceanographic Institution (WHOI) in Woods Hole, Massachusetts, found that our seas may have arrived much earlier on our planet than previously thought.

The study pushes back the clock on the origin of Earth's water by hundreds of millions of years, to around 4.6 billion years ago, when all the worlds of the inner solar system were still forming.

Scientists had suspected that our planet formed dry, with high-energy impacts creating a molten surface on the infant Earth. Water came much later, went the thinking, thanks to collisions with wet comets and asteroids.

"Some people have argued that any water molecules that were present as the planets were forming would have evaporated or been blown off into space," said study co-author Horst Marschall, a geologist at WHOI.

For that reason, he said, scientists thought that "surface water as it exists on our planet today must have come much, much later—hundreds of millions of years later."

Ancient Origins

But no one was certain. To pin down the exact time of the arrival of Earth's water, the study team turned to analyzing meteorites thought to have formed at different times in the history of the solar system.

First, they looked at carbonaceous chondrite meteorites that have been dated as the oldest ones known. They formed around the same time as the sun, before the first planets.

Next they examined meteorites that are thought to have originated from the large asteroid Vesta, which formed in the same region as Earth, some 14 million years after the solar system's birth.

"These primitive meteorites resemble the bulk solar system composition," said Sune Nielsen of the WHOI, a study co-author. "They have quite a lot of water in them, and have been thought of before as candidates for the origin of Earth's water."

Vestal Waters

The team's measurements show that meteorites from Vesta have the same chemistry as the carbonaceous chondrites and rocks found on Earth. This means that carbonaceous chondrites are the most likely common source of water.

"The study shows that Earth's water most likely accreted at the same time as the rock," said Marschall.

"The planet formed as a wet planet with water on the surface."

While the authors are not ruling out that some of the water that covers 70 percent of Earth today may have arrived later, their findings suggest that there was enough already here for life to have begun earlier than thought.

"Knowing that water came early to the inner solar system also means that the other inner planets could have been wet early and evolved life before they became the harsh environments they are today," explained Nielsen.

See for Yourself

Circling the sun between the orbits of Mars and Jupiter in the main asteroid belt, Vesta is the second largest asteroid known and has an ancient, battered surface.

For sky-watchers with binoculars, the magnitude 7.8 Vesta looks like a very faint, starlike object in a sea of stars. It is visible low in the southwestern sky after dusk, about 6 degrees above the bright orange star Antares, but only from a dark location. For those stuck under light-polluted city skies, I recommend looking at the asteroid with a pair of binoculars or small telescope.

Although you can easily see the asteroid with binoculars, a telescope will allow you to watch it move in front of a background of stars.

With a help of the star charts above, steadily held binoculars, and some patience, you should be able to find distant Vesta, some 267 million miles (430 million kilometers) away. Sky and Telescope's website has some printable sky charts for extra help.

"Mystery of Earth's Water Origin Solved",30/10/2014, online at:
http://news.nationalgeographic.com/news/2014/10/141030-starstruck-earth-water-origin-vesta-science/

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