Set to become the most populous nation on earth by 2022, India sees a steady decline in its groundwater level. A film festival drew public attention to the issue. ► CULTURE: PAGE 12

As water challenges become more pronounced and visible, we have the mission to more quickly connect the dots. Telling the story of the world's water crises is among the greatest imperatives in history. ► LAST WORD: PAGE 14

STOCKHOLM
WATERFRONT
THE FORUM FOR GLOBAL WATER ISSUES | # 4 | NOVEMBER 2015

GOOD COP, BAD COP?

We take a look at the best and worst possible outcomes of COP21

FAR AWAY FROM PARIS

While negotiators pull all-nighters in Le Bourget, those affected by climate change struggle to adapt

THE DRY WEST

Is desalination the answer to California's water challenge?

PUBLISHED BY STOCKHOLM INTERNATIONAL WATER INSTITUTE

EDITORIAL

Photo: Thomas Henrikson

ME, AN ASTRONAUT?

I think this issue of Water-Front illustrates better than ever that there is no blanket solution to the world's water crises. There is no single correct answer. There are thousands of them. The water challenges facing us, whether they result from climate change, population growth, increased demand or mismanagement, must be met with both global and local solutions, both high-tech and low-tech innovations. A huge industrial investment or a major policy shift cannot alone change our water future, and neither can the local efforts of a group of farmers. But if we combine all this hard work and great ideas, we will be able to change the world.

Regardless of how an initiative starts, it can end up having an enormous impact on very many people. This is clearly exemplified by this year's Stockholm Water Prize Laureate, Rajendra Singh, and his work in rural India. I hope he will inspire many more tireless, passionate water workers.

I see a growing sense of what I would call realistic optimism, more people understand that we can only solve the water crises with joint efforts. And we have a huge job ahead of us!

In this issue, don't miss the stories where we have interviewed farmers in Ivory Coast and Philippines about the challenges they face and the solutions they are working on. We list the best and worst possible outcomes of COP21. We discuss if desalination could be a solution to California's water problems. We visit a water film festival in India, and finally, in the Last Word, water work is likened to the job of an astronaut... Happy reading!

Torgny Holmgren
Executive Director
Stockholm International Water Institute

CONTENT

The printing process and paper have been certified according to the Nordic Swan label for environmental quality.

PRINTING 13,000 • CIRCULATION 35,000 ISSN 1102 7053

SIWI

NO. 4 • NOV 2015

COVER PHOTO Istock

STOCKHOLM WATERFRONT

Stockholm WaterFront is a quarterly magazine that aims to inform the global water debate and be a source of knowledge and inspiration for professionals worldwide with an interest in water issues. Stockholm Water Front mixes popular science articles with news reporting and carries analyses by some of the world's most knowledgeable water writers. It is published in print and digitally by Stockholm International Water Institute, and is free of charge.

STOCKHOLM INTERNATIONAL WATER INSTITUTE

Box 101 87
Visiting Address: Linnégatan 87A
SE-100 55, Stockholm, Sweden
Tel: +46 8 121 360 00
Fax: +46 8 121 360 01 | www.siwi.org

PUBLISHER

Torgny Holmgren | Executive Director

EDITORIAL STAFF

Victoria Engstrand-Neacsu | Editor
Elin Ingblom | Graphic Designer

EDITORIAL BOARD

Britt-Louise Andersson
Jens Berggren
Moa Cortobius
Anton Earle
Karin Lexén
Jan Lundqvist
Josh Weinberg

CONTACT THE EDITORIAL TEAM:
WATERFRONT@SIWI.ORG

FEATURED CONTRIBUTOR

Photo: Circle of Blue

J. Carl Ganter is Managing Director of Circle of Blue where he directs a team of award-winning journalists and data researchers reporting from the front lines of the world's water challenges. In this issue he has written the Last Word, about telling the story of the world's water crises.

Why is it so important that we get the water stories out there?
Stories are how we communicate, inspire and are moved to act. Throughout history, water has defined the civilization's greatest moments and its most profound failures – it's the most important story of our era.

BRIEFING

WATER AND TEXTILE SUSTAINABILITY PROJECT WINS TOP FASHION AWARD

A collaboration for efficiency in water consumption, energy and chemical use in the textile industry has won the prestigious Swedish 2015 Habit Fashion Award for Sustainability.

Sustainable Water Resources (SWAR) is a joint initiative between SIWI, Sida, Swedish fashion brands Indiska, KappAhl and Lindex, their Indian suppliers and sub-suppliers. SWAR was honoured by the Habit jury for its impact in increasing efficient water, energy and chemical use at factory level.

SWAR factories saved seven per cent of their total annual water use, 360 million litres. This amount equals the daily need of more than 3.5 million people. Through its parent network, Sweden Textile Water Initiative, the pilot programme has now scaled up in India, China, Bangladesh, Turkey, and Ethiopia, expanding to 120 factories supplying 20 major Swedish brands.

Read more: www.siwi.org/news

Renée Andersson (Indiska), Rami Abdelrahman (SIWI), Anna-Karin Dahlberg (Lindex) and Eva Kindgren de Boer (KappAhl)

Photo: Kalle Assbring

NEW PARTNERSHIP FOR BRAINSTORM ON WATER

South Africa is a water-scarce country in need of innovation to secure the resource for future generations. This is the premise for a newly initiated partnership between Water Research Commission (WRC) and Water Environment Research Foundation (WERF). The project will engage the entire water sector to exchange ideas and discuss high-priority technology topics, with the aim to elevate water innovation in the country, currently experiencing a devasting drought.

"It is important to translate research, development and innovation into real solutions", said Dhesigen Naidoo, CEO of WRC.

Read more: www.wrc.org.za

Photo: iStock

14

Of the 33 likely most water stressed countries in 2040 are in the Middle East.

Source: World Resources Institute

JOBS KEY IN GREEN TRANSITION

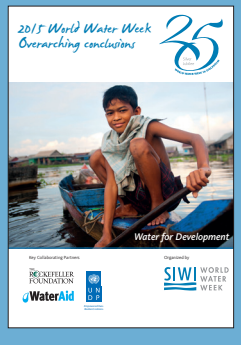
The International Labour Organization (ILO) has hosted an expert meeting on green jobs. The meeting highlighted the need to shift from a carbon-based economy to environmentally sustainable economies and societies for all, and that decent work must be a key element of this transition. The meeting ended with proposals for actors in the world of work to implement the outcomes of COP21 in Paris, with appropriate policy tools and instruments.

Read more: www.ilo.org/global

THE WEEK IN 20 PAGES

The Overarching Conclusions sum up a very successful 2015 World Water Week. This year's theme, Water for Development, showed yet again how water is what links all aspects of development. Affecting our daily lives in a way no other resource does, it is a measure of how well or poorly a society fares. With 3,300 participants from 130 countries, and participants from an ever-widening range of communities, World Water Week is cementing its position as the world's most important annual conference about water and water-related issues.

www.worldwaterweek.org



WORLD WATER WEEK JOURNALIST GRANTEE WINS ENVIRONMENT AWARD

Photo: Stella Paul

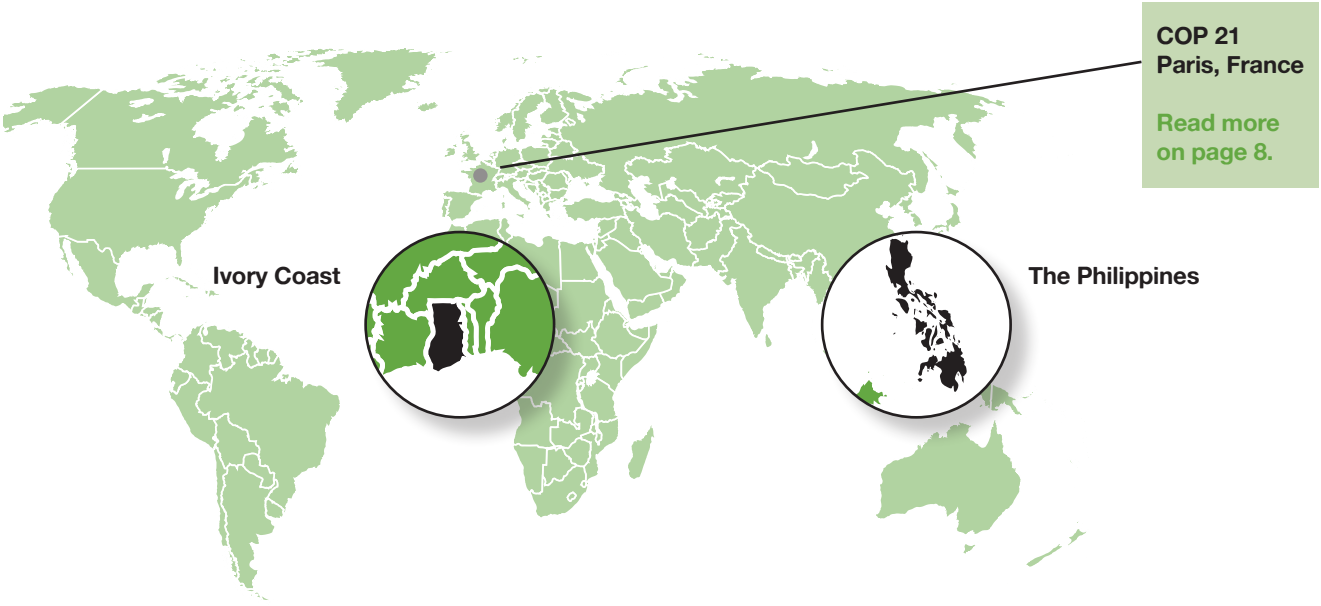
One of the World Water Week Journalist Grant winners, Stella Paul from India, has won the Environmental Blogger of the Year award during the recent Asian Environment Journalism Awards. Stella Paul reports water and environment stories, often with a gender filter. It is the third year in a row that she wins one of the Asian Environmental Journalism Awards.

Read Stella's blog: stellasmusings.blogspot.se

FAR AWAY FROM PARIS

In December, world leaders, delegates, civil society representatives, business people and environment correspondents will be crowding in lecture theatres, around negotiating tables and at cocktails in Paris, during the biggest meeting the French capital has ever seen, the COP21.

Meanwhile, those groups who already feel the effects of climate change on their lives and livelihoods, struggle to adapt. WaterFront sent reporters to talk to farmers in Ivory Coast and the Philippines, in different parts of the world, to ask how they cope with a changing climate.



IVORY COAST
TREES KEY TO RESILIENCE

TEXT & PHOTO | SELAY MARIUS KOUASSI

IN THE NORTHERN AND CENTRAL IVORY COAST REGIONS, THE STRUGGLE WITH WEATHER AND CLIMATE EXTREMES HAS PROMPTED A FOCUS ON THE CULTIVATION OF NATIVE TREES, AND INNOVATIVE IRRIGATION METHODS.

"I have suffered huge losses due to the 2010 drought that exacerbated water shortages. More than 80 per cent of my maize crop was spoiled because of the bad dry season," Siriki Foffié, a 45-year-old farmer from Sirasso


Seedlings for reforestation.

village, in Korhogo district in Ivory Coast's northern region, complained.

In the searing temperatures of late 2010, which hovered around 40 degrees Celsius, Foffié, his wife and six children appraisingly gazed at his four-hectare maize farm to see what they could save. The scorching sun had already devastated much of the crop, leaving a warm and dusty soil under their feet.

"The farmers are a step ahead of the government"

"Delayed rains coupled with windstorms flattened our maize crops," Foffié remembers.

Farmers all over the Sirasso area suffered the same fate during that period.

Consequently, most of them have cut back on cash crop farming, investing in the planting of trees to provide shade from the sun for their conventional crops.

Kolia Tuo, 38, is among those who adopted the tree-planting strategy in order to cope with drought and improve food security. Senna Siamea (or Cassia) trees run in close parallel rows along his sorghum farm.

"These climate change adaptation and resilience initiatives in the agriculture sector are led by farmers themselves. It is important to underline that they are a step ahead of the government, which has yet to fully implement its reforestation and climate change adaptation and resilience plans, mainly due to budget constraints," Marcellin Guié, an agronomist and weather specialist with the National Agriculture Research Institute (ANADER) said.

"Because the trees provide shade, the evaporation rate is slower. They help cool temperatures. They have greatly improved the water-content of the soil so far. They also posed as windbreaks that keep dry topsoil from going airborne. With the fallen leaves that inject nutrients into the soil, we will no longer have to resort to using expensive fertilizers," Tuo declared, when asked how planting trees benefits him.

But, for Tuo, Foffié and their fellow small-scale farmers, the gain is even greater. Re-greening initiatives have had positive impacts on crop yields and incomes.

"There has been an average of 85 kilos of extra yield for every hectare that has been re-greened," Tuo said with a smile.

Last year, Foffié harvested 1.8 tonnes of grains, nearly twice the average 850-900 kilogrammes of maize per hectare he usually gets.

AGRICULTURE IN IVORY COAST

Ivory Coast's economy is largely dependent on agriculture. It accounts for over 40 per cent of the gross domestic product (GDP) and engages roughly 68 per cent of the 20 million strong population.

"I am expecting a bumper maize crop the coming season," Foffié said confidently.

In a similar manner, a growing number of farmers from Ivory Coast's central Moronou region are developing climate change resilience – drought resistant techniques – to make agriculture more productive while using less water. ●●●

Théodore Konan and his brothers grow a tree nursery at the field border.

In Moronou, farmers also lost crops following the 2010 drought because they were unable to irrigate their crops properly as groundwater level dropped. Inserting trees in rice farms and cocoa fields reflects a growing determination among non-cash and cash crop farmers in the Moronou region to combat effects of climate change.

Théodore Konan, who grows rice on his family's six hectares plot in Pacobo village, said planting trees had enriched the soil and reduced the amount of irrigation needed in fields by around 25 to 30 percent.

"We are now equipped to resist drought and my family has witnessed a huge harvest of rice and potatoes in 2014, more than doubling our 2013 output", Konan said.

Guié said a growing number of farmers from the drought-prone parts of the country are willing to experiment those techniques to reinforce their resilience to drought and boost their harvests.

"In the drought-hit Odienne District in north-eastern Ivory Coast where farmers have heard about successes of their colleagues from the northern and the central regions, these techniques are gaining new fans. But what these farmers lack the most is the quick support of the government," Guié added.

Editor's note: While this story suggests that trees conserve water by providing shade and reduced evaporation, studies of forest hydrology show that trees, especially alien species, consume more water than they conserve.

THE PHILIPPINES
FARMERS FACE TWIN DISASTERS

TEXT & PHOTO | RHAYDZ B. BARCIA

FARMERS IN THE PHILIPPINES ARE OFTEN AT THE MERCY OF NATURAL CALAMITIES WORSENED BY CLIMATE CHANGE. IN THE LEAD-UP TO COP21, FILIPINO FARMERS ARE TAKING A BEATING ON TWO FRONTS.

Today, Filipino farmers are facing twin disasters – both the El Niño weather phenomenon and the devastating impact of typhoon Lando (international name Koppu).

Koppu is the second strongest typhoon to hit the Philippines in 2015. It has destroyed more than 400,000 metric tonnes of rice set to be harvested before the end of the year, according to the Department of Agriculture.

Meanwhile, at least 46 out of the 81 provinces across the country are suffering from severe drought due to El Niño. In the southern part of Luzon island, farmers are praying for precious drops from heaven.

Pedro "Pedring" Destura, 50, father of six children and a local farmer in the town of Prioto Diaz, Sorsogon, is praying for rain so that he can plant rice to feed his family.

He is tilling more than a hectare of land, where he has grown rice for over 20 years. But because of El Niño, his farm has turned barren.

Pedring said the changing climate affects planting seasons and hampers food production in the countryside. He said the weather nowadays is "confusing" compared to 15-20 years ago.

"I hope the onset of the rainy season will be as it used to, so I can plant rice early to feed my family and send my

The changing climate affects planting seasons and hampers food production.

THE WEATHER REPORT

El Niño Southern Oscillation (ENSO) is a recurrent ocean-warming and atmospheric disturbance resulting in deficient rainfall or prolonged drought in some areas and heavy rains, storms and typhoons in other areas of the world. The Philippines weather bureau said that El Niño will peak between November this year and the first quarter of 2016.

Silvestre "Ka Silver" B. Bonto, regional chairman of Bicol Region Confederation of Irrigators Association and chairman of National Irrigators Association of the Philippines

children to school. Before, we were able to plant rice as early as June and we could harvest our palay (unhusked rice) in the month of August or early part of September, but to date we don't know when we can plant rice. There is no rain. The weather is so confusing now," he said.

Pedring says he and his fellow farmers are trying to adapt to the present climate. But the erratic weather, with dry spells and drought, disrupts the usual planting season. Among the six provinces of Bicol region in southern Luzon, Sorsogon and Masbate are the most drought-affected areas, while four other provinces are affected by dry spells.

Silvestre "Ka Silver" B. Bonto, regional chairman of Bicol Region Confederation of Irrigators Association (BIRCIA) and chairman of National Irrigators Association of the Philippines (NCIP) said El Niño phenomenon has had a severe effect on rice production in the Philippines.

"With El Niño, the Philippines' food production is badly affected as half of the 1.5 million hectares irrigated rice land has been affected by drought. This means that 8 million bags of potential harvest will be lost. This will badly affect our food sufficiency and will drain our government's coffer as a huge amount of our dollar reserve will be channeled to rice import," Bonto said.

According to him, about 50 to 60 per cent of the Philippines rice farms are irrigated. Half of the irrigated rice-land is waterless to date due to El Niño's effect.

His group, the Confederation of Irrigators, produced at least 14 to 15 million metric tonnes of rice annually between 2009 and 2014.

"For Philippines to be rice sufficient we need to produce 21 million metric tonnes (MT) through climate smart agriculture adaptation measures," said Bonto.

He said that rain-fed and upland crops are the first affected when small streams and creeks, including small run-of-the river systems, dry up. To address the irrigation crisis, Bonto said that an underground water impounding reservoir should be put up by the government to store available water during heavy rains.

"As we go through and suffer from erratic weather, we need to build underground water reservoirs in problematic areas so that during the rainy season or typhoons we can store available water for future usage for farming. We need the help of the government to realize this project for climate-smart agriculture," he said.

"The weather is so confusing now"

To address the water shortage for farming, the National Irrigation Administration agency initiated rehabilitation and repair of irrigation facilities and structures for the long-term mitigating measures on a yearly basis since 2010.

Ed Yu, National Irrigation Administration (NIA) regional spokesman, said the dry spell has affected more than 4,000 hectares of irrigated rice lands across the Bicol region.

He said that for the first cropping season this year, farmers complained of low yields due to water shortage brought by the dry spell.

To mitigate the adverse effect of El Niño, the NIA is employing contingency measures to address the pressing problem, such as water rationing and massive rehabilitation and repairs of irrigation facilities and structures for better and efficient delivery of water to farms.

HOW LOW CAN WE GO?

THE BEGINNING OF THE END, OR A JOINT GLOBAL EFFORT TO SAVE THE PLANET? THE EYES OF THE WORLD WILL BE UPON PARIS AND THE CLIMATE NEGOTIATIONS IN DECEMBER.

It all started with the Earth Summit in Rio in 1992, when the UN Framework Convention on Climate Change (UNFCCC) was adopted.

In early December this year, as many as 50,000 participants, including 25,000 official delegates, are expected to descend on the French capital for what many label as one of the most important global meetings, ever.

The aim is to reach a universal, legally binding agreement that will keep temperature increase below two degrees Celsius as compared to pre-industrial levels. Building on new scientific evidence, some are as bold as to suggest a 1.5 degree increase as the goal, while others are pessimistic about reaching any agreement at all.

WaterFront decided to look closer at the best, and worst, possible outcomes of COP21. Here are our Good COP, Bad COP scenarios. ●

Illustrations: original: istock and adaptation: Elin Ingblom

GOOD COP

- ✓ A binding agreement is reached, with goals to limit temperature increase to 1.5 degrees Celsius compared to pre-industrial levels.
- ✓ Low-income countries feel they have confidence in high-income countries and trust their intention to actively support mitigation and adaptation efforts.
- ✓ Water is adequately addressed in the agreement. Since climate change is felt through too little or too much water, it is duly considered in both mitigation and adaptation measures.
- ✓ All countries hand in ambitious and realistic national climate plans (known as Nationally Determined Contributions, NDCs), for the post-2020 period and signal that they plan to scale up commitments at regular intervals.
- ✓ A multitude of robust initiatives come from cities, companies and other central stakeholders. They commit to work together beyond Paris for concrete, lasting change.

BAD COP

- ✗ No deal.
- ✗ High-income countries fail to demonstrate a will to support low-income countries mitigate and adapt to climate change. Poor nations feel disappointed that rich nations do not take responsibility.
- ✗ Water is not addressed, or written into the agreement.
- ✗ Submitted national climate plans are insufficient or unrealistic, resulting in poor or failed implementation.
  All actors from the voluntary side push responsibility onto the formal side of the conference i.e. the agreement.
- ✗ Voluntary actors promote their own ideas and brands instead of working with others for long-term results.

THE PARIS CLIMATE MEETING

CALIFORNIA'S WATER CHALLENGE

IS DESALINATION THE ANSWER?

TEXT | TOM FREYBERG PHOTO | ISTOCK AND IDE TECHNOLOGIES

HISTORICALLY RELIANT ON THE COLORADO RIVER AND SIERRA NEVADA SNOWPACK, THE CURRENT, CRIPPLING DROUGHT IS FORCING CALIFORNIA TO RE-THINK ITS WATER RESOURCES. WHAT ROLES WILL DESALINATION AND WATER REUSE PLAY?

A television commercial promoting California may boast year-long sunshine and a nation of laid-back citizens that "dream big", but a more serious problem has hit the North American State. California is now in its fourth year of drought. Although the state has a history of water scarcity, scientists warn this four-year period of drought could be the worst in 1,200 years, affecting as many as 40 million people. Part of the problem has been that the state receives the majority of its water from the Sierra Nevada snowpack and the Colorado River. With levels at their lowest and reservoirs running dry, it has forced politicians, city officials and water authorities to join forces and make hard decisions about securing future water supplies.

Conservation and desalination | In January 2014 Governor Jerry Brown declared a state of emergency and asked Californians to voluntarily cut water use by 20 per cent. In need of stronger measures, coupled with intensifying drought conditions, state water agencies then issued warnings and penalties for overusing water.

California boasts one of the world's leading indirect water reuse projects – the Orange County Groundwater Replenishment System. Local media sources also report that a billion dollar direct potable water reuse programme is being considered by the Metropolitan Water District of Southern California.

Large scale desalination projects – purifying seawater into drinking water (see box) - have not been as successful, despite California bordering the vast Pacific Ocean.

In the 1990s the City of Santa Barbara in the northern part of the state installed a seawater desalination plant. It was mothballed shortly after commissioning, with some of the water technology sold and shipped to the Middle East. In October this year it was announced that the Charles E. Meyer desalination plant would be brought back •••

••• to life. The once redundant project will now be refurbished, operated and maintained as part of Design-Build-Operate public-private-partnership. By October 2016, it is expected to start supplying 26 per cent of Santa Barbara's water needs.

The Carlsbad Crusade | Prior to this announcement, testing started at the Carlsbad desalination plant, nearly 200 miles south of Santa Barbara. Controversially, the plant has been met by strong environmental opposition. As a result, it took 12 years of planning and over six years in the state's permitting process, before reaching the commissioning phase. It will eventually provide seven per cent of San Diego County's water needs.

"You can forgo many things – water is not one of them," says Ziv Shor, project manager at IDE Technologies, who is involved in both projects. "Desalination is a drought-proof solution to help combat California's water scarcity. Conservation and water reuse are important but they will not meet all of California's needs."

For others, such as US scientist Peter Gleick, president of independent think tank Pacific Institute, desalination is not the silver bullet to California's water problems.

Speaking to WaterFront, he says: "Desalination will play no role whatsoever in solving California's drought, unless the drought continues for many more years, and even then, it will play a very minor role. For California, other options – especially agricultural and urban efficiency improvements, stormwater capture, and increased use of recycled treated water - have far larger potential at far lower cost."

Intake regulation change | With Poseidon Resources – the company behind the Carlsbad project – progressing on another project in Huntington Beach, it could be said that, despite a slow start, seawater desalination has been gaining momentum in California. Yet a decision from the State Water Resources Control Board (SWRCB) in May this year could add a complication.

Five years in development, the Water Quality Control Plan for Ocean Waters was amended by the SWRCB. The changes targeted the intake and outfall of desalination plants: where seawater is taken into the plant and the leftover brine discharged to the sea.

Rather than open intakes, used in the majority of large scale projects globally, California has set a preference for sub-surface intakes to be used – buried under the seabed. The change has been implemented to protect plankton and fauna in the ocean, according to Claire Waggoner, environmental scientist at SWRCB.

Inevitably, the regulatory change has been divisive, potentially pushing the engineering and environmentalist communities further apart.

"Despite overwhelming success of seawater reverse osmosis worldwide, including locations where the sea is carefully protected like Australia, the Caribbean and the Mediterranean, the state of California has imposed restrictive regulations that deal with a problem that may not exist," says Randy Truby, comptroller of industry body the International Desalination Association (IDA).

Desalination

What is it?

Desalination, also called desalting, is a process that produces fresh water from seawater (high salinity) or brackish water (lower salinity) by removing dissolved salts. The process has been used for millennia, with Aristotle writing about seawater desalination in 320 BC. Today the major desalination processes employ either membranes or thermal technologies. Membrane-based desalination, also called reverse osmosis, accounts for 60 per cent and involves forcing water through a membrane using pressure, in the process removing the salts. Thermal techniques include multiple-effect distillation (MED) and multi-stage flash (MSF), which essentially involve boiling water, capturing the evaporation and then condensing it into drinking water.

While Truby believes that the new requirement could double desalination project costs, the Pacific Institute's Gleick believes it is the right decision.

"The guidelines are likely to make new plants somewhat harder to develop, but this is the right thing to do, rather than impose these environmental damages on the environment without paying the full costs," he says.

The Australian experience | While still in its development phase in California, desalination has provided the majority of water in certain Middle East countries, such as Qatar and Saudi Arabia. There are now over 18,000 desalination plants operating around the world (see box). As a result of severe droughts, between 2004 and 2012 Australia built six large seawater desalination plants at an investment of AUS 12 billion. One of these projects was the Victoria project, finished in 2012 but put on standby after the drought eased. The Victoria Government, as California has done in Santa Barbara, is now considering reopening the Wonthaggi project to ease drought conditions in the region following low rainfall.

"Desalination will play no role whatsoever in solving California's drought"

Neil Palmer, CEO of the National Centre of Excellence in Desalination Australia (NCEDA) believes that lessons should be learned from the similarities between Australia and California. "Australian experience has shown that open intakes do not adversely impact the marine environment," he tells WaterFront. "This has been pointed out to the California regulators, but they have preferred to listen to alarmists and ignore facts."

Stemming losses | Measures to make California's water networks more efficient are as crucial a part of the overall puzzle as augmenting supply. After all, there is little point pouring more water in to fill a bucket if you have not fixed the holes in the bottom.

To provide a revised focus on reducing water losses, at the start of October 2015 Governor Brown signed a law to reduce the millions of cubic metres of water lost every year from leaks in aging and cracked water pipes. The new bill, scheduled to be implemented in October 2017, will require California's urban water departments and private water companies to audit their systems and report annual water loss figures.

It is clear that California is at the start of an interesting journey to reduce reliance on the Colorado River and the Sierra Nevada snowpack. Desalination, water reuse, conservation and improved efficiency will all have a part to play in the ever complex and political world of water supply and demand. One thing is for sure: Californian officials will indeed have to "dream big" if they want to secure water supplies quickly and alleviate ongoing water stress. ●

Major projects

As of June 2015, there are more than 18,426 desalination plants around the world, producing more than 86.8 million cubic metres of water per day. The market is worth USD 12.8 billion and is expected to grow to USD 19.9 billion by 2020. The top five desalination plants in operation include:

- **Shoaiba 3** (880,000 m^3/day – MSF), Saudi Arabia (2009)
- **Al Jubail, Marafiq** (800,000 m^3/day - MED), Saudi Arabia (2010)
- **Jebel Ali M Station** (636,440 m^3/day - MSF), United Arab Emirates (2013)
- **Soreq** (540,000 m^3/day- reverse osmosis), Israel (2013)
- **Magtaa** (500,000 m^3/day – reverse osmosis), Algeria (2014)

*Source: IDA/GWI

Tom Freyberg is chief editor of Water and Wastewater International magazine.

INDIAN FILM FESTIVAL HIGHLIGHTS GROWING WATER STRESS

TEXT | STELLA PAUL PHOTO | STELLA PAUL AND ISTOCK

POISED TO BECOME THE MOST POPULOUS NATION ON EARTH BY 2022, INDIA IS WITNESSING A STEADY DECLINE IN ITS GROUNDWATER LEVEL. A RECENT FILM FESTIVAL DREW PUBLIC ATTENTION TO THIS CRUCIAL ISSUE.

"There is no real development without water. So, if our government wants to bring true development, it must make water central to every strategy," said Sant Balbir Singh Seechewal – a Sikh priest from India's Punjab state.

Seechewal, who for decades has been campaigning against releasing sewage slush and industrial effluents into the state's water bodies, was in New Delhi this October, attending the 8th edition of CMS Vatavaran – India's only international festival on environment and wildlife. Themed "Water for life", the five-day festival screened 70 documentary films of which eight were chosen winners in various categories. Seechewal was the protagonist of "The Battle Begins" – one of the winners that depicted how the religious guru engaged hundreds of community members into rejuvenation of Kali Bein – a 110-miles long, dying river in Punjab.

Organized by CMS – a Delhi-based research think tank, the festival started in 2002. Held at the NDMC Convention Center which is located in the heart of city, the film festival not only showcased films made by Indian and international film makers, but also organized several panel discussions, workshops for media personnel and water activists, exhibitions of wildlife and water photographs, sale of organic vegetables and spices, and hand-spun clothes and uncultivated forest-food products.

At the core of the festival was, of course, the talk of India's declining water resources and the urgent need to conserve them. According to N Bhaskar Rao, Chairman of CMS, the decline of water sources is "the biggest and the most sensitive" of all the environmental issues – the reason why it was chosen as the theme of the film festival:

"Communities here need more water solutions. How will they find it? They can do this through learning from each other. Film, as a media, can help bring more water initiatives into the light and help people learn of them," said Rao.

The latest groundwater monitoring data released by the government of India support Rao's statement. According to the data, there was a sharp decline in ground water levels across the country. Around 39 per cent of the wells across the country were also showing decline in ground water level, said the report. The reasons were cited to be rapid industrialization, irrigation and population increase – India now has a whooping 1.311 billion-strong population.

The population growth has been also decreasing per capita availability of water, said Sanwar Lal Jat – India's Minister of State for Water Resources, River Development and Ganga Rejuvenation. According to Jat, in 2001, the average annual per capita availability of water in the country was 1,816 cubic meters. Today it has decreased to 1,545 cubic meters.

"The government has been focusing on conservation of water, minimizing wastage and ensuring its more equitable distribution," Jat said.

"The decline of water sources is the biggest and the most sensitive of all the environmental issues"

Rajendra Singh, 2015 Stockholm Water Prize laureate, told the audience at a recent water film festival that Indians must be encouraged to conserve water.

But, according to Rajendra Singh – the 2015 Stockholm Water Prize laureate, the biggest need of the hour was to promote water education to encourage every Indian to conserve water.

"Without enough water, India cannot eliminate either poverty or hunger – both of which are at the heart of the Sustainable Development Goals (SDGs). So, we need water action and water conservation for achieving the sustainable development goals. We need to educate people on this and films are a great way to do that," said Singh who is popularly known as the "Water Man of India".

A notable portion of the visitors to the film festival, including filmmakers, were youths many of whom could be seen watching the films and also enthusiastically checking out the organic food products. Gaurav Kumar, a young visitor who claimed to have watched over 20 films, said that he had learnt to take water more seriously.

"I learnt that there were about 80 water bodies within Delhi city just a few decades ago of which only six now exist. That was shocking. But I also learnt now that even as an individual I can do something to conserve water – like harvesting rainwater and not throw rubbish in a river etc. You can call me a convert to conservation," said the youth with a smile. ●

"Working in the water space is like being an astronaut"

TEXT | J. CARL GANTER PHOTO CIRCLE OF BLUE

On December 24, 1968, Apollo 8 astronaut William Anders took one of the most famous pictures in history: a breathtaking image of a tiny, vulnerable blue planet hanging in space. Twenty-five years later, Jerry Linenger flew on the space shuttle Atlantis to the Russian space station, Mir, where he would spend five months in orbit.

"Looking out the window, I could see the great sources of freshwater on the planet," he told me with awe. "Lake Baikal. The Great Lakes. The mighty rivers of the world – Nile, Tigris, Euphrates, Amazon. But still, when stepping back and looking at the big picture, not so much different from our little orbiting space station. A closed ecosystem, with only so many sources of life-sustaining water. And all the creatures of Earth, just like the three of us circling it, all dependent on water."

Water was so scarce aboard Linenger's ship that he and his crew recycled their own sweat and urine. From the vulnerable space capsule, he also spent countless hours studying where he wanted to raise his family when he returned to the ground below. Of anywhere in the world, he chose the shoreline of Lake Michigan, a place with... plenty of water.

Yet, four decades after humanity first saw our family portrait, a tiny circle of blue above the Moon's horizon, we face the risk of unprecedented systemic failure. We see water scarcity disrupting energy production, triggering food shortages, upending economic development and threatening political stability. When Linenger looked down on the planet, he could see dust storms swirling on the steppes of Mongolia, their fingers of sand reaching to Beijing and across the Pacific to Los Angeles.

In many ways, working in the water space is like being an astronaut with rare perspective. We see connections that others miss. We see how complex systems can trigger a drought and unrest in one corner of the world while floods wreak devastation in another. We measure snowpack, count raindrops, value ecosystems, estimate groundwater supplies from space, and explore the nexus. We see how safe water and sanitation can transform entire cultures and economies.

As water challenges become more pronounced and visible globally in an era of climate change, the water community has the imperative mission to more quickly connect the dots – to combine revealing data, personally engaging narratives, collaborative science, and social engagement in much more exciting, enticing ways than ever before. Telling the story of the world's water crises, together, is among the greatest imperatives in history.

At a time when celebrity or political antics can drown out our messages, let's set our bar high. At every opportunity, every inflection point good or bad, our collective water stories should connect, inform, inspire and engage. Like John F. Kennedy, who challenged a nation to look to the stars, we must use all tools of storytelling that will make this daunting challenge, with all of its pain and promise, relevant, meaningful and compelling.

Man set foot upon the moon with no more technology than an old-fashioned pocket calculator. Against all odds, the achievement sprang from the power of stories, the immediacy and awe of iconic images, and the collective innovation of artists, designers, engineers, and entrepreneurs who not only took us to the moon, but showed that tenacity and shared vision can tackle even the most grave challenges on Earth. ●

J. Carl Ganter is Managing Director of Circle of Blue.

CALENDAR

29 NOVEMBER-3 DECEMBER
MURDOCH UNIVERSITY, PERTH, WESTERN AUSTRALIA
Sustainable Water Management 2015

The conference will explore new and innovative methods of freshwater and wastewater management for human settlements, including treatment and reuse. A better understanding and assessment of resources and their supporting ecosystems is required.

Improved conservation and approaches to achieve the dual aim of socio-economic development and ecological protection will contribute towards sustainability of water resources.

swm2015.com

7-9 DECEMBER
SAN DIEGO, USA
The 2015 International Water & Climate Forum

The forum will take the discussion about adaptation and mitigation in the water sector to the next level by focusing on what utilities are doing on the ground in their communities to implement climate adaptation and mitigating strategies. This unique event will mobilize attendees to be visionary thinkers and to expand their knowledge base with the ultimate goal of promoting long-term sustainability and fostering water supply and ecosystem resilience.

www.waterclimateforum.org

7-8 DECEMBER
PARIS, FRANCE
COP21

The main objective of the Conference of Parties (COP) is to review the Convention's implementation. Since the first COP in 1995, significant meetings have included COP3 where the Kyoto Protocol was adopted, COP11 where the Montreal Action Plan was produced, COP15 in Copenhagen where an agreement to success Kyoto Protocol was unfortunately not realized and COP17 in Durban where the Green Climate Fund was created. COP21, also known as the 2015 Paris Climate Conference, will, for the first time in over 20 years of UN negotiations, aim to achieve a legally binding and universal agreement on climate, with the aim of keeping global warming below 2°C.

www.cop21paris.org

COP20: Achim Stainer, UNEP Executive Director at SIF14 in Lima

18-21 JANUARY
ABU DHABI
International Water Summit

The International Water Summit (IWS) is the leading global meeting point for showcasing and developing solutions for water sustainability in arid regions. Over four days in January 2015, IWS brought together government leaders, thought leaders, entrepreneurs, technologists, policymakers and thousands of trade visitors to rise to the severe challenges faced by water-scarce areas.

iwsabudhabi.com

22-26 FEBRUARY
NAIROBI, KENYA
18th AfWA International Congress & Exhibition

Theme: Sustainable Access to Water and Sanitation in Africa
The African Water Association (AfWA) is a self-governing non-profit organization which aims to cover all facets of the water cycle. The overarching goal of AfWA' s International Water Congress series is to identify, showcase and debate practical experiences and examples of service provision in developing countries that work, and critically, work at large scale.

www.afwacongress2016.org

FOLLOW US

TWITTER **@siwi_water #wwweek**
FACEBOOK **SIWI**
LINKEDIN **SIWI**
MEDIAHUB **siwi.org/mediahub**

DON'T MISS THE NEXT ISSUE, OUT IN FEBRUARY!

STOCKHOLM **WATERFRONT**

SEASONS GREETINGS TO ALL OUR READERS!