



Malin Falkenmark on the need for a new understanding of water's stabilizing role for the planet.



Meet Jackie King, whose tools to assess river flow made her the 2019 Stockholm Water Prize laureate.

STOCKHOLM

WATER FRONT

#1 | MAY | 2019

NEWS BRIEFS

Disappearing wetlands, declining river flows and more.



WATER & YOUTH

Sanna Vannar wants justice for future generations

Time to think about the future

What will future generations say? All over the world – in parliaments, courts, and streets – people are beginning to discuss intergenerational justice and the responsibility we have towards those who will come after us.

In this issue of WaterFront, Professor Malin Falkenmark alerts us all that the past lack of understanding of water's role for life on Earth is putting future generations at risk. Don't miss her compelling call for an updated view on the functions performed by water, on page 12.

For a look at the trend of increased youth activism and what this means for water, turn to page 4. On the following pages you will also meet young people from different parts of the world with innovative ideas to purify water, support social innovation, turn air to water and to hold decision-makers accountable for climate policy.

We also feature an interview with Jackie King, Stockholm Water Prize Laureate 2019, who talks about why we must protect and restore rivers for future generations, on page 14.

In Last Word, on page 18, Asma Bachikh from World Youth Parliament for Water shares her thoughts on how young people can make a difference. She advocates for more mentoring and sharing of knowledge between generations. This is a topic particularly close to my heart – we must listen to each other and also reflect on what our grandchildren's children may one day say.

Enjoy the read!



Torgny Holmgren
Executive Director,
SIWI

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Young people making waves across the world



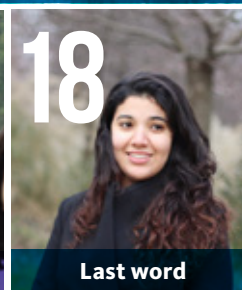
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Jackie King receives Stockholm Water Prize 2019

On 19 March it was announced that Dr. Jackie King from South Africa will be awarded Stockholm Water Prize 2019 for her work on environmental flows, developing tools so that decision-makers can more accurately assess the cost of de-watering rivers. **Meet her on page 14.**

Environmental flows to form part of SDG 6 indicator

The importance of environmental flows is not only recognized by Stockholm Water Prize but also by the UN's Food and Agriculture Organization, FAO. In January they announced that environmental flows should now form part of the "water stress" assessments of Sustainable Development Goal 6. Indicator 6.4.2 on water stress addresses the balance between the amount of water abstracted for human use and the overall quantity of water. In the context of SDG indicator 6.4.2, the environmental flows are defined, as "the quantity and timing of freshwater flows and levels necessary to sustain aquatic ecosystems which, in turn, support human cultures, economies, sustainable livelihoods, and well-being."



Landmark complaint to the UN

In May, indigenous people from the low-lying Torres Strait Islands off Australia's northeast coast filed a landmark complaint with the UN Human Rights Committee. They argue that rising seas caused by global warming are threatening their homelands and culture, which constitutes a violation of their human rights. According to ClientEarth, an environmental law NGO backing the case, this was the first time a complaint was lodged with the UN linking alleged government inaction on climate change to the violation of human rights.

54% of wetlands present in 1900 had been lost by 2000.

Source: Global Assessment Report on Biodiversity and Ecosystem Services

Rapid degradation of freshwater ecosystems

The Global Assessment Report on Biodiversity and Ecosystem Services, presented in May, was the first global biodiversity assessment since 2005. Among its key findings are several warnings about fragile freshwater ecosystems. Loss of wetlands is of particular concern since they disappear at a rate that, in percentage terms, is three times faster than forest loss. Crop and livestock operations currently co-opt more than 33 per cent of Earth's land surface and 75 per cent of its freshwater resources.



Only a third of rivers remain free flowing

Researchers from McGill University in Canada and WWF have tried to assess how many of the world's major rivers that flow without interruption from for example dams. Of 246 longer than 1,000km, only 90 remain free flowing, according to the researchers. Untouched rivers are largely found in remote places such as the Arctic and Amazonia.



For the past few years young people have become more active in water issues. The recent climate strikes, inspired by the Swedish student Greta Thunberg are fuelling the trend.
Photos: Tommy Bloom, Flickr | Karin Desmarowitz/campact, Flickr | World Economic Forum / Valeriano Di Domenico, Flickr



WATER AND YOUTH

Text | Maria Sköld

All over the world, young people are getting involved in water issues – as innovators, activists and entrepreneurs. The young are increasingly sought after in development projects and political campaigns. But, at the same time, there is also a strong rise in street protests and court cases with plaintiffs claiming that environmental practices threaten the rights of future generations. Meet some of the young people making a splash (p 7–11).

This story does not begin with Greta Thunberg's school strike in August 2018. Rather, the past few months of climate-related youth activism could be seen as the most recent manifestation of something that has been brewing for years. The old way of looking at the planet has come into question.

Since 15-year old Greta Thunberg first took position in front of the Swedish parliament on 20 August last year, she has inspired thousands of students in more than 100 countries to join the school strike and climate march movement. This recent wave of youth activism has implications also for the water world, says Antonella Vagliente, Director General of the NGO Young Water Solutions:

“It’s incredible, really! In Belgium, where I live, the student movement is highly visible and they’re having a definite impact on politics.”

She believes this will make it easier also for young water activists in general to make their voices heard. Politicians are increasingly reaching out to young voters to discuss the long-term sustainability of projects and both environmental NGOs and climate scientists

have been quick to side with the student movement.

“There is a growing interest in what young people have to say, which is important because they often have a different view on things,” Antonella Vagliente argues.

She sees many examples of this, across the globe. Her own background is partly with the influential Agua & Juventud movement (Water & Youth) that started in her native Argentina in 2007 and has since spread to more than 30 countries. Already as a 15-year old, Antonella Vagliente joined another youth-led environment organization, Ecoclubes, which dates back to the early 1990s. She was propelled to action by the realization that two million of her fellow citizens lacked access to safe water and sanitation.

“**Many young** people find local water problems that they want to fix. They often have a very practical view and are quite updated on needs and trends. Given that half the global population is under the age of 30, the only way we can achieve the sustainable development goals from the 2030 Agenda is by involving the young,” she says.

Indeed, the 2030 Agenda for Sustainable Development from 2015 has done much to spearhead youth involvement, according to Asma Bachikh, former President of the World Youth Parliament for Water.

“With the 2030 Agenda, it became important for organizations to involve young people to obtain funding. Of course, at times it may be more like ‘another box to tick’, but I think we’re beginning to see some real changes,” Asma Bachikh says.

The year 2015 can be viewed as a defining moment for youth activism for another reason as well. In June that year, the environment organization Urgenda won a case against the Dutch government, forcing it to take stronger measures against climate change. At present, there are around 1,000 similar cases around the world, often with young activists as plaintiffs. According to a report from the UN’s environment programme, UNEP, the number has trebled since 2014 and looks set to grow.

The Urgenda case has done much to inspire similar lawsuits in other



Antonella Vagliente, Director General of the NGO Young Water Solutions.

Photo: Mikael Ullén

●●● countries, not least because it was actually successful, unlike many previous attempts.

Another much-publicized court case is *Juliana et al v United States of America*, where 21 youth plaintiffs filed a lawsuit in the federal district court in Oregon against the United States, the US president, and various other federal officials and agencies. They claimed that US government agencies have violated youth's rights by allowing activities that significantly harm their rights to life and liberty. The US Department of Justice has argued that there is no ground for judicial action but in 2016 the US District Court of Oregon upheld the idea that access to a clean environment should be considered a fundamental right. It remains to be seen if there will eventually be a trial or not.

A key concept in the *Juliana* case is intergenerational equity, with world renowned climate expert James Hansen acting on behalf of future generations. The idea that current generations must take the needs of future generations into account is gaining traction, in the Extinction Rebellion as well as academic studies.

A recent example is from the release of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (Ibpes) in May, with stark warnings that the world's ecosystems are in a dramatically more fragile state than previously understood. "If we leave it to later generations to clear up the mess, I don't think they will forgive us," one of the main authors, Professor Andy Purvis, commented in the *Guardian*.



The People's Climate Case in Europe is one of many examples where people take decision-makers to court for inaction. Read more on page 10. Photo: Mihai Stoica

Equally important and related is the concept of nature as a bearer of rights. In Colombia, 25 young people between 7 and 25 won a court case in 2018, where they argued both that the government failed to impose sufficient measures against climate change and that the Amazon was not given enough protection, which endangered their rights to a healthy environment, life, health, food and water. In its verdict, the Supreme Court ruled in favour of the plaintiffs, proclaiming that the Amazon has rights and ordering the government to create an "intergenerational pact for the life of the Colombian Amazon". A year earlier, the Colombian river Atrato had also been recognized as having rights.

Antonella Vagliente from Young Water Solutions emphasizes the importance of

this being a global movement. Similarly, she sees how young people across the world are innovating and starting businesses to tackle water challenges.

"This is different from previous generations. Young people also need employment, so they often start a business rather than a project to address problems they see," she says.

Three years ago, Young Water Solutions therefore started the Young Water Fellowship Programme, through which entrepreneurs can apply for support to establish a business based on a water initiative. They have received hundreds of applications, mostly from Africa, and so far, 19 people have been accepted, with another 10 set to enter the programme. Selected candidates receive training, mentorship and funding, usually around €3000 to €5000. After a one-month training course, covering business topics as well as water and sanitation, the fellows present their business pilot based on what they have learned and get feedback from a mentor.

"We encourage social entrepreneurship, so that the project is not just technically adequate but also financially sustainable. A strong trend is that young people are very business conscious and, at the same time, interested in applying traditional knowledge, for example through nature-based solutions. Here we need much more intergenerational learning," Antonella Vagliente says.

Young Water Fellowships Programme

Founded in 2015. Organized by Young Water Solutions, an NGO seeking to empower young people working with water resources management and water, sanitation and hygiene (WASH) issues. Has so far supported 19 projects in 13 countries.

The first three editions of the Young Water Fellowship were organized at global level, with trainings held in

Switzerland, Stockholm and Brussels. In 2019 the first regional edition will be held in Uganda for East African young entrepreneurs, and another is planned for Senegal in 2020. Currently, all trainings are in English, but future regional and national editions will be held in local languages.

To date, 15,000 people in local communities have benefited from the services provided by the fellows' companies.



Safe Drinking Water for All helps purify water in rural areas and began rolling out its services after support from the Young Water Fellowship Programme.

ANNA LUÍSA BESERRA – cleans water

What do you do?

Safe Drinking Water for All sells a low-cost device that uses sunlight to purify contaminated water through a technique called Agualuz. Today we are four people working here, Letícia, Lucas, Marcela and me.

The idea is simple: we use a container made of stainless steel with a glass cover, a pipe filter and a thermal indicator that changes colour when the water is ready. After a few hours in the sun, the water is free from pathogens that cause diseases like dysentery, salmonella and cholera. The process saves time, energy, money and the environment.

What inspired you to do this?

I got the idea in 2013 when I was 15 and wanted to take part in Brazil's Young Scientist Award. I always wanted to be a scientist and come up with simple,

scalable solutions to problems in my home region. Two years later, it went from being a hobby to a start-up.

Why is clean water so important?

Every two minutes, a child dies from a waterborne disease. In Brazil alone, 35 million people lack access to safe drinking water. Of them, 14 million live in the semi-arid region where they often use cisterns to store rainwater, but that water is not suitable for consumption. Our solution can help them and can also be used in other parts of the world. ●

ANNA LUÍSA BESERRA

CEO Safe Drinking Water for All

Lives in: Salvador, Bahia, Brazil

Does: Biotechnology

Age: 21



Photos: Safe Drinking Water for All



Majik Water's solutions have been featured in Financial Time's list of 50 world-changing ideas and made Beth Koigi a finalist in the UK's Royal Academy of Engineering Africa Prize. The concept is used here at the Ark Children's Home in Kenya. Photo: Beth Koigi

BETH KOIGI – turns air to water

What do you do?

Water scarcity is a growing problem in Kenya, so to tackle that, we at Majik Waters have developed air-to-water solutions. There are six times more water in the air than in all the rivers in the world! But the technology is very young, so at first it was very difficult, we had no financing and our prototype is very expensive. We started in 2017 and still have many issues to resolve. It was a great help to be a fellow of the Young Water Fellowship Programme. Eventually we also partnered with a South African company. Today the main challenge is that the process still is too energy-intensive, so we would need new partners to work on that.

What inspired you to do this?

I first invented a water filter when I was at university because the water there

wasn't purified. Out of that I started a company because I began to realize that different waters require different filters. At the market you usually just find one kind to buy but it may not be very effective where you live. But after the drought in 2016, we have a new situation when we sometimes don't have any water at all, so now my focus is on water scarcity made possible through Young Water Fellowship Programme.

Why are water issues important to young people?

Interest in water issues is growing in Kenya, because the water situation is worsening. Young people, as guardians of the future, need to get involved. People must understand more about water and we need solutions-oriented policies to mitigate climate change and tackle water scarcity and water contamination. ●



Photo: Majik Water

BETH KOIGI

CEO Majik Water

Lives in: Kiambu Kenya

Does: CEO Majik Water

Age: 27



Kishoth Navaretnarajah represented Sri Lanka in the 2013 Stockholm Junior Water Prize finals. Today that project is not only implemented in his home community but is being developed by a co-team.

KISHOTH NAVARETNARAJAH – creates

What do you do?

I lead the Sagacious Youth Lead Consortium, a not-for-profit organization for young people led by young people who want to engage in community innovations, linked to water, environment, and research. The idea grew out of my participation in Stockholm Junior Water Prize 2013. We focus a lot on innovation and have just co-started a Community Innovation Centre, DreamSpace Academy, to tackle authentic socio-economic and environmental challenges. People can work on social innovations for their communities to make them more resilient through Maker Education and Open Innovation. Ultimately they become successful social entrepreneurs. In a country like Sri Lanka this is not just about finding technical solutions, it also contributes to peace building and youth empowerment.

What inspired you to do this?

For me, participating in Stockholm Junior Water Prize was life changing! It got me interested in the environment and water research. I also felt I wanted to do something for my community. We received support to develop the project that took us to Stockholm, a method to optimize soil moisture using solar evaporation, which requires less water and gives higher yields. It is now used in my home community.

Why is the environment important for peace?

After the Sri Lankan civil war ended in 2009, nature was destroyed. We started a tree planting programme and are doing gardening with schools. For youth and children this has come to symbolize peace and reconciliation where different faiths come together. Many are trauma-

tized by the war but it helps to do things like watering plants and gardening. After the recent terror attacks this kind of activities can make us stay strong and united. ●



Photos: SYLC

KISHOTH NAVARETNARAJAH

Director Sagacious Youth Lead Consortium and DreamSpace Academy

Lives in: Batticaloa, East Coast of Sri Lanka

Does: Information Technology

Age: 24



In 2018, Sanna Vannar's organization Sáminuorra joined forces with ten families from Fiji, France, Germany, Italy, Kenya, Portugal and Romania. Together they filed a climate-change case in the EU General Court, the People's Climate Case. They argue that the EU's climate targets for 2030 are insufficient to protect their fundamental rights to life, health, occupation and property. Photo: Sanna Vannar

SANNA VANNAR – goes to court

Why are water issues important to you?

With climate change comes a water crisis, causing our land, small lakes and marshes, to dry up. Ground water levels drop, there's an increase in forest fires and ecosystems are affected. For example, in our lakes we see how char, which needs cold water, is being replaced by trout.

How does this affect the Sami people?

Our traditional way of life changes since it is so linked to nature. Not least is it noticeable for us reindeer herders. The reindeer suffer when they can't find water or food. The basis for their existence is threatened. And if the reindeer would disappear, the whole Sami culture is in peril.

We're used to living in harmony with nature, following the seasons. But that predictability is gone. We no longer know when the spring flood will come, for

example, so we can't rely on the old way of using our lands. Suddenly, traditional knowledge isn't valid anymore. We have already been affected by damming of rivers, for example, but the situation is exacerbated by climate change

So why have you filed a lawsuit against the European Union?

It started about a year ago, when Sáminuorra joined forces with ten families. The present climate change targets of the EU won't be enough, so we demand a higher level of ambition. To be clear, we're not against the European Union, The People's Climate Case is a call for the EU to do its job and protect us from climate change. And we're not doing it hoping to get monetary compensation, because money can't buy us land for our reindeer or protect our culture. We demand that the EU takes action.

Sadly, many of the changes we now see have been visible in our communities for quite a while. But it's very difficult to get people to listen. We felt this was a new way to maybe finally get heard. ●

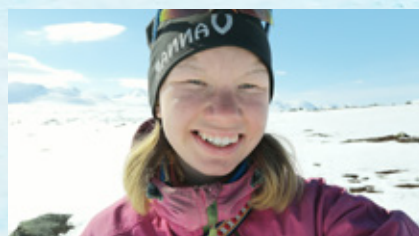


Photo: Sáminuorra

SANNA VANNAR

President Sáminuorra

Lives in: Jokkmokk, Sweden

Does: President of the Sámi youth organization Sáminuorra, reindeer herder

Age: 23



Pak Vitae's filters are used by more than 11,000 people in three different communities in Pakistan and one in India. Photo: Pak Vitae

USAMA TANVEER – helps refugees

What do you do?

We're a start-up with three founders, all chemical engineers, and developed low-cost water filters based on hollow fibre membranes. Our filters are now used by more than 11,000 people in three different communities in Pakistan and one in India. We serve the Afghan Refugee Project, the Faisalabad remote village project, the Haroon Abad District School and a flood-affected area in Indian Kerala. We do monthly visits to collect data so we can develop our products further.

What inspired you to do this?

It all started back in 2015 after one of our founders suffered from chronic diarrhea, making him realize the hardships and pain experience by many people in our country, Pakistan. We began to understand the graveness of the situation with waterborne disease and decided to

leverage our technical background to do something.

I've been helped by getting to study at the Florida State University, USA, and meeting leading experts in my field. We also got seed money from winning first prize in the Fowler Global Social Innovation Challenge at University of San Diego and from the Young Water Fellowship.

What have been the main challenges?

We wanted to provide solutions for the most underserved communities. That means, the filters can't depend on electricity. They must be cost effective and have a long life, being able to filter 400,000 litres of water. And they should be easy to use and able to tolerate a high flowrate, so that they can be used on a large scale.

I really believe in the power of sustainable technological innovations to

bring peace, prosperity and opportunities. With our innovation we hope to give one million people access clean drinking water by 2020. ●



Photo: Hult Prize

USAMA TANVEER

Chief of Innovation and Technology, Pak Vitae

Lives in: Lahore, Pakistan

Does: Chemical engineer, does membrane research for water treatment

Age: 22

WATER'S HIDDEN ROLES AND FUNCTIONS

Text | Malin Falkenmark

The past lack of understanding of water's role for all life on Earth is putting future generations at risk. There is an urgent need for an updated view on the different roles and functions that water performs to stabilize the planet's life support system, to avoid pushing it to the brink of collapse. Professor Malin Falkenmark, together with Professor Johan Rockström and researcher Lan Wang-Erlandsson, recently described water's stabilizing role for the life support system in the Anthropocene era in *Journal of Hydrology X*. Professor Falkenmark here shares this new understanding with *WaterFront's* readers.

Since the Mar del Plata Water Conference, the water expertise has been paying most attention to the liquid, blue water, while its role not only in terrestrial ecology but also in stabilizing the Planet's life support system has remained a blindspot. First of all, the only water that plants can take up to support their biomass production is in fact the green water in the soil. Therefore, in the current era of beginning climate change and sharpening, more intensive droughts, continued population growth in vast dry climate regions, and continued socio-economic development, there is an urgent need to better understand the global water system, and possible limitations in its ability to support the human endeavours. As a first step, the overall Planetary Water Boundary, defined in 2009, is currently developed in terms of five different sub-boundaries.

“...water scarcity and severe water quality deterioration have contributed to the decline of ancient empires, like the Maya empire (800–900 AD), and the Antique Arabian civilization (800–1300 AD).”

Network of hidden roles and functions

The many stabilizing roles of water in the water cycle are now being increasingly clarified: water is first of all acting in three central roles (Rockström

et al 2014). In a *control role*, it has a multitude of stabilizing functions, upholding biomass growth and biodiversity; as a *victim* it is being impacted by land-use activities and water pollution; and in its role as *agent*, it is generating the fundamental task of moisture feedback from land to atmosphere.

In the recent paper *Water resilience for human prosperity* (Falkenmark et al 2019), eight core water functions are identified in water's interaction with the land system through which it passes, which contribute to the stabilization of the life support system. Three water functions are green: generation of air moisture with a greenhouse gas function, that keeps the planet 30 centigrades warmer than without H₂O; biomass production; and moisture feedback to the atmosphere. Altogether, up to 170 per cent the precipitation over land is involved in these green water functions.

The blue water functions are altogether five, but together involve less than 100 per cent of land precipitation; they involve serving society with water supply; carrier of nutrients and waste; aquatic storages; production; and aquatic biomass growth.

Together, these water flows, roles and functions form a densely bundled network with its surroundings, giving life to ecosystems with their ability to support human activities.

Witnessed ecosystem collapses

Humans, however, by their activities, alter the water partitioning in the water cycle, disturbing the core water functions, and degrading the ecosystems and their ability to withstand and recover from shocks. Over time, severe ecosystem disturbances have been

generated in both water systems, land use systems and climate-related systems. Degraded green-water dominated ecosystems include desertification, savannization and salinization, while blue-water dominated

NS IN STABILIZING THE LIFE SUPPORT

phenomena include basin closure, aquifer depletion, eutrophication and aquatic system collapses.

History shows that regional scale ecosystem degradation may sometimes even shake societies. Thus, water scarcity and severe water quality deterioration have contributed to the decline of ancient empires, like the Maya empire (800–900 AD), and the Antique Arabian civilization (800–1300 AD).

More recent collapses of food systems, after prolonged droughts, have contributed to escalating human conflict and national instability both through the Arab spring and the Syrian war.

Future outlook

Thus, water with its enormous diversity, is a core component of the Planet's life support system, and has, with its roles and functions, been essential in stabilizing the system over time. It will therefore be crucial for continuing this stabilization of human livelihood. As in the past, human interference in all these essential water functions, green as well as blue, will of course continue to modify the system, challenging the ability of the coming generation to find out how to keep the system stabilized.

A central question for the next generation will be how further future stresses, caused by the ongoing climate change, population growth, and increasing human demands, will continue to disturb the life support system. Will its stabilizing ability, in other words the water resilience-based interactions between water flows, functions and roles, on the one hand, and core ecological processes, like production of oxygen, food, timber, energy, and biodiversity, on the other, be able to keep the system in balance? And what risks will be involved? In view of the strong driving forces in the Anthropocene, the complex interactions with social-economic phenomena will evidently need special attention.

Mar del Plata Conference

A UN Conference on Water held in Mar del Plata, Argentina, in 1977 to assess the status of water resources and ensure that an adequate supply of quality water was available to meet the planet's socio-economic needs. Other goals were to increase water use efficiency and to promote preparedness to avoid a water crisis of global dimensions.



ABOUT THE AUTHOR

Professor Malin Falkenmark is a globally renowned water expert and serves as Senior Scientific Advisor to SIWI.

Hydrological lens remains at the center of human life support

Furthermore, the most visible manifestation of climate change will be displayed through the hydrological lens – in the form of e.g., floods, droughts, sea-level rise, etc. – and may trigger an understudied interplay of ecological, biophysical and social feedbacks. At the same time, uncertainty is an important component in current predictions of Earth's future climate, associated with clouds, i.e. the water in the sky, and the dynamics of biosphere carbon feedbacks, related directly to water cycle resilience. Thus, the role of water for future Earth system resilience will be essential to clarify further.

The critical question to focus on will be what shifts will be needed to keep the planet in the present favourable Holocenelike conditions with relatively stable climate, by safe navigation of the life support system: What transformations will be needed? What changes in governance approaches in terms of scope, scale, and speed will be required? HOW can that be done? ●

J. Rockström, M. Falkenmark, C. Folke, M. Lannerstad, J. Barro, E. Enfors, L. Gordon, J. Heinke, H. Hoff, C. Pahl-Wostl, *Water resilience for human prosperity*. Cambridge University Press, New York (2014)

M. Falkenmark, L. Wang-Erlandsson & J. Rockström *Understanding of water resilience in the Anthropocene*, Journal of Hydrology X, Vol 2 (2019)



Jackie King loves rivers. Not only has she spent decades studying what makes them stay healthy, but she has also been able to translate that knowledge into practical tools for decision-makers.

River lover with new tools

When Dr Jackie King understood that the world's rivers were drastically declining in condition, she found her true calling. Through years of research and advisory work, she has become a world leader in guiding sustainable development of water resources. Her work has helped decision-makers understand that there are costs as well as benefits to damming and de-watering rivers. For this, Jackie King is awarded the 2019 Stockholm Water Prize.

Text | Maria Sköld **Photos** | Ravi Gajjar and Private



Together with local water managers, Jackie King analyzes the flows of the Neelum river in Pakistan. The analysis was used by the Permanent Court of Arbitration in the Hague to assess the impact of the Kishenganga Dam built in India.

Dr King started her career as a researcher and freshwater ecologist at the University of Cape Town in South Africa in 1975. At that time reports were starting to appear globally of declining rivers and disappearing fisheries, even where there was no pollution. A major cause was alteration of the natural pattern of river flows through damming and water extraction.

Responding to the growing concern and supported with funding from her country's Water Research Commission, Jackie King dedicated three decades to researching river ecosystems, beginning the conceptual foundation and method development that underpins her present work.

By the turn of the century, she and colleagues Dr Cate Brown and Dr Alison Joubert were creating ecosystem models that demonstrate the ecological and social implications of changing the natural flow of rivers. The scenarios they produce allow governments and stakeholders to objectively assess the costs of water-resource developments that could emerge linked to benefits such as hydro-power and irrigated crops.

The scenarios describe possible futures and allow people to negotiate for the one they would prefer. The pattern of

flows agreed for river maintenance are commonly called Environmental Flows.

Through the work of Jackie King and her colleagues in several countries, EFlows are increasingly achieving legal standing across the world.

Jackie King is a well-known and very popular name in large parts of the water community. She has worked in more

developing world rely on healthy rivers for their lives and livelihoods. I saw landscapes with dying fish and elephants, dead trees all along the banks, people drinking from and washing in muddy trickles, and southern Africa's great migratory herds and birds starting to lose their watery destinations one by one, and thought it does not have to be this way.

“We must view the three pillars of sustainable development – ecological integrity, social equity and economic wealth – equally and seriously, and not subsume all to an economic bottom line.”

than 20 countries and with governments in the Mekong, Zambezi, Indus and Okavango river basins, among others. The ideas and models are increasingly being used by national governments and international institutions such as the World Bank, International Finance Corporation and Asian Development Bank.

What motivates you?

“I began this work when I learned that rivers were dying due to loss of the water that created and sustains them. I became more determined when I realized that hundreds of millions of people across the

“I felt that the silent voices of riverine ecosystems and their people had to be acknowledged.

“We must view the three pillars of sustainable development – ecological integrity, social equity and economic wealth – equally and seriously, and not subsume all to an economic bottom line. “I set out to learn the language of engineers, hydrologists, hydraulicians and funders so that we could present our findings in words that they could relate to. We have brought a different kind of information to decision makers and they are increasingly listening.” ●●●



Working in Kashmir, Pakistan, under tight security.

JACKIE KING

Lives in: Cape Town, South Africa

Family: Daughter Emma and son Sam. Son-in-law Bernie and daughter-in-law Svetlana.

CAREER:

Started full-time research at the age of 46 and chose to do research rather than being a lecturer. In 1990 she began creating Environmental Flows tools and has since worked as an advisor in Africa and Asia on river basin planning and management. After retiring from the University of South Africa in 1990 she set up her own consultancy, Water Matters.

●●● **What is it that you want decision-makers to understand?**

“Water-resource developments bring costs in terms of declining ecosystems, landscapes and livelihoods, as well as benefits such as water security, crops and energy. Costs of a declining river system could include, for instance, loss of river, estuarine and marine fisheries; loss of river-dependent terrestrial life; loss of construction material, firewood, food and medicines for riparian communities; bank erosion and loss of land; increasing animal and plant pests of humans and livestock, and water-borne diseases; declining water quality that needs ever more costly purification to be made potable; increasingly severe flood and droughts; loss of iconic conservation areas; and failing cultural and religious values. We can now describe those and

many other costs at the same level of detail and confidence as the engineers and economists describe the benefits.

“The consequent trade-off between costs and benefits as planning and development proceed is a decision of governments and their stakeholders, and there is no single right answer. Different countries will have different aspirations, and our job is to help them understand their options.”

What does that mean for development?

“I am not anti-development but I am pro balanced, caring development. We should not only be considering the full range of costs and benefits of development but also doing this before decisions have been made. At the moment, the ecosystem and social studies are more often than not rudimentary and done

“It has been a wonderful journey of discovery, hope and collaboration.”

after a decision on, say, dam location and size, has already been made and so we are relegated to tinkering with an already laid down plan. The planning process must be turned around so that these become a structured input to the development decision and not a reaction to it.”

Can your ecosystem models also help countries collaborate?

“Yes, the models are wonderful trans-boundary planning tools, allowing each country to see what they gain and lose under any proposed development.”

“We have created the concept of

Development Space, which I believe supports truly sustainable development. This identifies present conditions of a river ecosystem and its people and, through scenarios that describe possible futures, allows them to choose which are unacceptable to them. The ‘space’, or potential between present day and that unacceptable future, indicates the amount of development the ecosystem can support sustainably. The countries can then negotiate how much of the potential each of them can use.

“I hope the unacceptable future they identify will hold good and, importantly, that they will plan how to live permanently within the space it defines, rather than shifting the limit every few years as demands escalate.”

What rights should the people have who live by the rivers?

“The rights of riparian people with strong livelihood links to rivers were rarely addressed in development projects until about the turn of the century. They are probably the people most likely to be negatively impacted and least able to voice their concern. They should at the very least understand the possible futures awaiting them and be able to add their voice to the negotiations on what will happen.

“Sometimes development that damages the ecosystem quite significantly will proceed because of the needed benefits. What do we do then about the people most impacted? My first international

work, in 1997, was on the Lesotho Highland Water Project, where water was dammed in Lesotho and diverted for use in South Africa. Guided by the social anthropologist Ted Scudder we located 150,000 people living downstream in Lesotho who had close links with the rivers and would be impacted by them being dammed.

“We quantified as best we could at that time the river goods and services they would lose and the health implications for them and their livestock. They were paid several million US\$ compensation in what the World Bank claimed was a global first for quantifying the social

and ecological consequences of development and making reparation. This is still not routinely done but needs to be a part of the costing wherever it is relevant.”

How controversial were your ideas at first?

“It was hard at first, because such thinking was just emerging globally. The ideas were new, there were no text-books or recipes to follow and relevant data were virtually non-existent. We were essentially inserting another ‘water user’ into an already overloaded group of users. We learnt to use best-available knowledge – from the world literature, experts and locals – to express uncertainty and open our minds to the wider world of implications we were becoming aware of. We were condescended to by some, and our work trivialized, but for every detractor there were many more, in governments, funding bodies, and construction companies, ready to listen and try to make it work. It has been a wonderful journey of discovery, hope and collaboration.”

What are the main challenges for the future?

“The over-arching challenge is to ensure this new kind of awareness and thinking gains traction throughout the government, funder and developer hierarchies. For every government or other relevant body that now embraces this perception



Jackie King has always opted to be an independent researcher. Today she runs her own consultancy.

Photo: Ravi Cajjar

of development, there are many more that have not or will not. Old practices die hard; business as usual is too often the practice. Specifics of what could be done (and indeed are being done in places) could include:

- Turning around the development and decision-making process so that the social and ecological aspects are thoroughly reported before development decisions are made.
- In developing countries with poor resources, sourcing funds to do this and training country personnel so that skills and awareness permeate through the country.
- Using the sophisticated ecosystem models now available as a crucial component of basin planning.
- Resisting the common perception

that any trickle of water released down a river is an Environmental Flow.

- Ensuring that both local wisdom and local concerns are structured inputs to decision making.”

Are you optimistic about the future?

“Yes and no. We have tools, techniques, data and understanding to help us that simply did not exist 30 years ago.”

“Sustainable development is on everyone’s lips and we are getting better at guiding how that can come about. But a burgeoning world population demands ever more resources, and in terms of water resources, as with so much else on our planet, we are doing poorly at protecting our precious life support systems. I live in hope, I continue to contribute where I can.” ●



Identifying vegetation in the Okavango Delta, Botswana.

Making real change

Text | Asma Bachikh

In recent years young people have become much more involved in the water community, which is great, but many problems remain unsolved, writes Asma Bachikh, former President of the World Youth Parliament for Water. Here she describes the change she would like to see.

When I became president of the World Youth Parliament for Water back in 2015, I really didn't know what I was getting into. Overnight, my whole life changed.

The World Youth Parliament for Water is a network acting for water around the world, so leading it meant a lot of work and co-ordination, especially with members in different time zones. It was like a full-time job, on top of my regular job as a programme manager.

At the same time, it was of course very exciting to be able to speak on behalf of an organization and to be invited to international conferences. Suddenly I found myself in an environment very different from where I come from.

I grew up in south-western Morocco, where we have a lot of water issues, and as a 19-year-old I started volunteering with local organizations. My focus was very hands-on, it involved taking part in awareness raising among local communities and especially young people on the need to preserve and sustainably manage our water resources.

All over the world, young people find themselves in similar situations. Their lives are shaped by water scarcity or unsafe sanitation and they want to change that. Sometimes their solutions can also turn into a way for them to support themselves. I wanted their voices to be heard in the international water debate, but I wasn't quite sure how.

As newly-elected president of the World Youth Parliament for Water I attended meetings leading up to World Water Week. At the time I wore braces and definitely stood out in the crowd; to me it seemed everyone else were men over 50 who already knew each other. It felt as if I had accidentally crashed a by-invitation-only-party and I was not comfortable speaking up about my own experiences as a young water activist. But things began to change when I got to know another young woman, a friendly project manager from South Korea, and realized I was not the only young person in the room.

The reason I talk about this is because it really matters how young people get involved in water issues. It is often assumed that it's enough to just invite a youth representative to a conference to gain a new perspective, but if that person feels very different from everyone else, he or she may not be able to

contribute very much. Organizations need to demonstrate that they are genuinely interested in young people's views.

After the 2030 Agenda was adopted in 2015, youth empowerment has become fashionable, since it is specifically mentioned in the agenda. Sometimes this makes organizations seek to involve young people just to look progressive and get access to new sources of funding. For me and other young people, this can create exciting opportunities to travel and meet interesting people, but it may not lead to any lasting change.

Instead, it's time to focus on the real challenges young people face, especially in low- and middle-income countries. Here are the three most important issues I would like to see the water community address:

- **Improve access to funding.** Many young people are involved in small projects that provide immediate concrete benefits to their local communities, for example the building of a school toilet. But it's very difficult to get funding for this type of small projects.
- **Focus on job-creation.** Surprisingly, there is hardly any research on how to create an enabling environment for innovation and startups among young people in the water sector. In addition, young people should be trained for more formal jobs since the average age for employees in the water sector is 50, according to the Water Development Report in 2016.
- **Bridge the knowledge gap.** Another way to foster intergenerational knowledge sharing is through mentor programmes, which are strangely lacking in the water community. Here more experienced professionals can support younger colleagues but it's also important for larger organizations to partner with smaller ones with fewer resources.

These suggestions are not very original or complicated – but they could make a big difference. In the regions with the most severe water problems, the majority of the population is young. In the Middle East/Northern Africa region, where I come from, we now have a young generation that is not only the largest ever, but also the best educated – and the most unemployed. This should be regarded as the resource it is. Young people have commitment and knowledge, they just need a chance to put it to practical use. ●



Photo: Global Water Partnership

12-13 JUNE
EAT FORUM

The EAT Forum on sustainable eating habits and the need for a global food transformation is organized in Stockholm.
<https://eatforum.org/>



Photo: Press

17-27 JUNE
BONN CLIMATE CHANGE CONFERENCE

Meeting in Bonn, Germany, ahead of COP25 with a Technical Examination Process on Mitigation. Water's intersecting role will be explored for example in relation to food and energy.
<https://unfccc.int/SB-50>



Photo: Thomas Henriksson

9-18 JULY
HIGH-LEVEL POLITICAL FORUM ON SDGs

Stock-taking on the progress on SDGs 4, 8, 10, 13, 16 and 17 in New York.
<https://sustainabledevelopment.un.org/hlpf/2019>

15-30 AUGUST
WORLD WATER WEEK
World Water Week will gather some 3,600 water experts, decision-makers and corporate leaders in Stockholm. This year's theme is Water for Society – Including All.
www.worldwaterweek.org

All publications can be found online at www.siwi.org/publications



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<https://www.siwi.org/publications/water-infrastructure-finance-constraints-shared-lessons-from-africa-and-europe/>

There is a strong business case for investments in rainfed agriculture, as demonstrated in this report from the Transforming Investments in African Rainfed Agriculture (TIARA) initiative.
<https://www.siwi.org/publications/unlocking-the-potential-of-rainfed-agriculture/>

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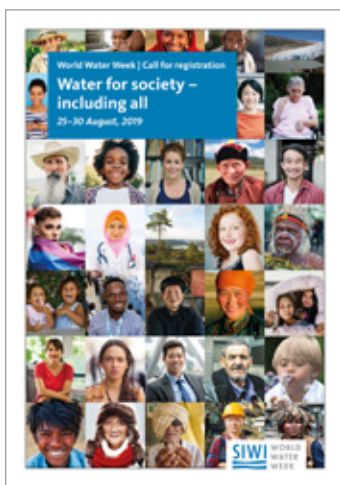


Foto: Henrik Trygg

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25–30 August 2019



World Water Week, the world's most influential movement transforming global water challenges, moves to a new venue this year.

Welcome to Tele 2 Arena, a multi-purpose stadium in central Stockholm, from 25 to 30 August.

This year's theme is *Water for society – including all*. Governments, businesses, civil society and academia all have a huge responsibility to build more resilient societies. To succeed, we need collaboration, with also the persons most affected having a say in key decisions.

We invite you to Stockholm in August to contribute to this global debate, to share your perspectives and experiences on equal footing.

Join the movement – together we need to achieve a water wise world for all.

Early bird registration closes June 30.

www.worldwaterweek.org

