



International Federation of Consulting Engineers  
The Global Voice of Consulting Engineers

# /SOW2021

State of the World

## Tackling the global water crisis

Actions today result in change tomorrow



A FIDIC report

# Contents

## /SOW2021

<b>Foreword</b>	<b>2</b>
<b>Executive summary and recommendations</b>	<b>3</b>
<b>Tackling the global water crisis and the world's water challenges</b>	<b>5</b>
Communities and their interaction with water systems – adapting the way we live? .....	9
Resilience is key .....	14
<b>Industry viewpoint</b>	<b>16</b>
<b>Oceans play an important role in climate mitigation</b>	<b>18</b>
Can carbon storage mitigate and teach us something? .....	20
<b>Industry viewpoint</b>	<b>22</b>
<b>Polluting today will not preserve tomorrow</b>	<b>24</b>
Our relationship with the oceans needs to improve.....	27
<b>Industry viewpoint</b>	<b>28</b>
<b>Water for agriculture and industry</b>	<b>30</b>
How can we influence this nexus moving forward?.....	32
<b>Industry viewpoint</b>	<b>35</b>
<b>What is next for global water systems?</b>	<b>37</b>
<b>Industry viewpoint</b>	<b>39</b>
<b>Project examples</b>	<b>41</b>
Water supply - Project examples .....	41
Water management - Project examples .....	46
Wastewater supply and treatment - Project examples .....	53
Drainage and flooding - Project examples .....	72
<b>Acknowledgments</b>	<b>78</b>
<b>About FIDIC</b>	<b>82</b>
FIDIC 2020-2024 priorities .....	82
<b>Recent FIDIC policy documents</b>	<b>83</b>
<b>Endnotes</b>	<b>85</b>

# Foreword from the President and CEO



**William  
Howard**  
President, FIDIC

The last State of the World report looked at establishing the value of water and discussed in detail how there are a wide range of factors that should be considered in establishing it. Amongst other things, the report reminded us that water is often undervalued and we are underinvesting if we are to achieve The UN water-related Sustainable Development Goals (SDGs). But increased investment is not enough – innovation is also needed to reduce costs in a sustainable manner.

Engineers can and should play a significant part in developing sustainable solutions to meet the incredibly complex and costly water needs we are all facing. As noted in the 2015 State of the World report, big-picture focus and proper planning will be essential in ensuring that the right projects are identified and that they are executed and maintained properly. While significant ‘traditional hard infrastructure’ will be necessary, natural and behavioural strategies must be part of the mix. The challenges are extraordinary but the engineering community, if given the resources, is up to leading the effort. After all, this is what we are trained to do.

To that extent, this report not only provides three recommendations focused on engaging industry, stakeholders and governments, it also highlights various projects that are demonstrating progress around the globe at this current point in time. That is not to say that things will not change, or projects improve, but we believe it is important to share information to learn from current best practices. It is only by understanding what we do today and with imagination and skill that we can achieve the potential of tomorrow.



**Dr Nelson  
Ogunshakin OBE**  
Chief Executive Officer, FIDIC

Following Covid, the environment has once again been rising up the agenda, especially amongst the younger generations and such momentum should not be wasted. There is an increasing awareness amongst individuals that want to live more sustainably. This includes how water integrates into our lives, considers the items we consume and how such activities will be increasingly important as we drive towards net zero.

It is imperative that activities are considered as part of larger systems, catchments and coastal protection areas. Failure to do so will mean that communities and society will constantly be fighting to maintain the status quo, simply shifting problems rather than resolving them. If we are to move forward, solutions need to be innovative and consider not only mitigation but reduction and control at the source.

Policies, theory and discussion, however, can only take the sector so far. It is also important to develop, nurture and create the right environment for future projects but to do so it is important we understand what is happening now.

It is only through understanding these achievements that engineers can derive tomorrow’s solutions moving us towards meeting the SDGs and climate goals.

As such, this report asks the whole sector to

- **Respect the importance of water.**
- **Renew efforts to meet SDG Goals.**
- **Rethink what approaches we need to take to sustainably achieve them.**

None of this will be easy. To be successful we will need to work with governments, stakeholders and importantly customers to rethink, engage and use their knowledge and expertise so we can hit the SDG goals. We have approximately 3,200 days or closer to approximately 2,000 with weekends, holidays, and lost time from Covid to deliver on this challenge. While time is not on our side, there are exciting opportunities for engineers to lead the quest for achieving the SDG goals and in so doing, make the world better for all of us.





**International Federation of Consulting Engineers**  
The Global Voice of Consulting Engineers

**/Executive summary and recommendations**

**/SOW 2021**



As noted in our first two State of the World reports, our infrastructure challenges are immense and it will take a concerted effort to resolve them. Every year, the world falls further behind and the gap between required and needed investment widens. It is likely that the COVID-19 pandemic and the increasing challenges related to climate change have increased our needs and exacerbated the 'investment gap problem'. The global water sector 'owns' an enormous amount of our infrastructure needs.

Our water challenges are appearing everywhere. Some of them have been with us for a very long time and many of these are getting worse. Others such as plastics and Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are just now being understood. It suffices to say that despite the incredible innovative things engineers and the scientific community can do and have done, millions of our fellow global citizens still lack access to safe drinking water and adequate sanitation. The water sector it is fair to say is facing unprecedented challenges from all fronts.

As the first report in the State of the World series revealed, the economic circumstances could not be more challenging as we exit from the Covid crisis. In that report we noted that the global infrastructure investment needs were estimated to be \$94 trillion between 2016 and 2040, which is 19% higher than current spending.<sup>i</sup> Then there is the additional pressure of not only meeting the investment needs of the current situation but ensuring that we meet the commitments of the SDGs. This is estimated to be between \$5 trillion and \$7 trillion a year.<sup>ii</sup> So, the additional pressure equates to potentially between \$1 trillion and \$3 trillion a year.

These numbers are large and while the engineering and scientific communities can do a lot to reduce them through innovation and proper planning, innovative financing from government, agencies, international funding institutions and the private sector will be required as well. We all need to work together to get the results we need to meet the SDG goals.

We believe that this report reinforces the recommendations from the previous State of the World publication entitled *Establishing the value of water - the business case for change*. There are a myriad of water issues we face and the innovative approaches engineers are implementing around the globe lead us to make three more recommendations which can be summarised by three words – **Respect, Renew and Rethink**.

FIDIC commits to take action to encourage everyone we interact with to respect the value of water and understand the importance of it to our survival. There are number of activities we have and will be implementing in this regard, including these State of the World reports.



FIDIC will encourage and assist the engineering and scientific community to build upon the many innovative approaches to addressing our water challenges being implemented around the globe and rethink how we can improve on them. This will include sharing lessons learned and knowledge via describing projects and approaches which have been successful in meeting complex multifaceted needs, reducing costs and conservation all in a sustainable manner.

FIDIC will encourage its members, partners and stakeholders to renew/revitalise efforts to invest adequately in addressing all of our water challenges so that the SDGs are met. Perhaps the growing awareness of climate change and the many visible water challenges we are facing will drive all of us to insist on more action.

The tasks at hand are challenging but they are creating opportunities for engineers and scientists to lead the world towards a better place. Let's all commit to doing our part in this regard.

