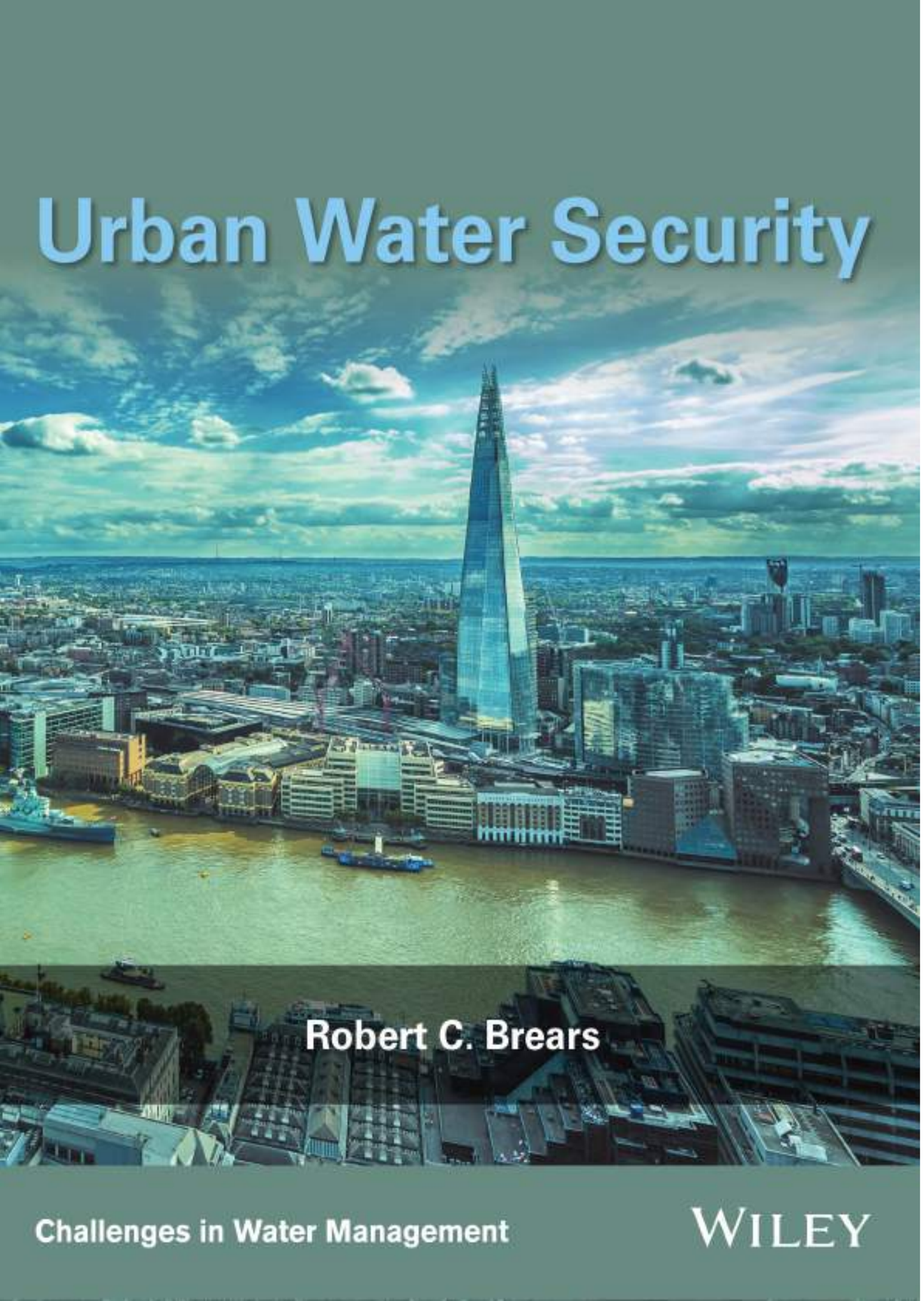
Vol 3. Issue 1, April 2020

Mark and Focus

Waste is so last season

Future resilient cities

Digital water + more



Mark and Focus

Mark and Focus covers both the risks and opportunities the world's mega-trends provide.

INTRODUCTION

In the 21st Century, the world faces a wide array of mega-trends including climate change and rapid population and economic growth. With resources becoming scarce global economic and social stability is threatened.

Mark and Focus covers both the risks and opportunities these mega-trends provide to business, governance, and society.

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TABLE OF CONTENTS

Vol 2. Issue 1, March 2019

Mark and Focus

Building resilient cities

Taking the plastic out of wastewater

BLUE AND GREEN CITIES

THE ROLE OF BLUE-GREEN INFRASTRUCTURE IN MANAGING URBAN WATER RESOURCES

ROBERT C. BREARS

Fashion circularity: waste is so last season

By Elisabeth van Roosendael

Circupreneur | Founder of Fortune Fold | 2X TEDx Speaker | Founding committee member of Zero Waste Victoria and Circular Economy Victoria| Ambassador for The Clothing Exchange and Global Fashion Exchange

How will we fashion a Circular Economy? We first need to find the courage to let go of following seemingly lucrative linear practices that destroy our biosphere. Then there's our leap into regenerative economic systems. We can form this new restorative trend of saving the planet in fashion through companies and consumers collaborating to ensure their supply chain works with and not against our environment.

The linear tragedy

Currently, the linear model of fashion has buyers at the mercy of the ever-changing trends dictated by the big fast fashion companies. Spun into a scarcity mindset, the tango between business and buyer has both suspended in a false reality of wealth. The garments that hide the true cost are reliant upon modern slavery to deliver throw away cost product. In 2013 the tragic Rana Plaza Collapse in Bangladesh that took over a thousand lives of garment workers and injured many more was a moment for the world of fashion to face their dire business decisions. Failing to justly acknowledge human capital in fast fashion has become the loose thread that unravels the failure of an industry to account for and restore the natural resources used to make clothes. The formation of Fashion Revolution seven years ago by Carry Somers and Orsola de Castro in response to the Bangladesh building collapse has now become a global movement pushing for greater transparency throughout fashion that is helping form a circular fashion industry.

Waste is so last season

Conscious, sustainable, second hand, swapped, borrowed, rented, repaired, vintage slow, circular are the trends percolating into the style zeitgeist wanting to assert they are not destroying the planet they call home. The mindful design dialogue is coming back season after season, year after year. They're here to stay. The conversation around fashion can't escape its impact, and so it's doing its best within the linear framework to respond with products and services that meet this demand. According to second-hand fashion resale platform ThredUp, purchase of used garments will overtake fast fashion within the next decade. However, the issue of waste and ecological destruction is systemic and must be solved with respect to the systems they impact. For instance, recycling plastic waste into fabric for fashion products initially sounds good to company and consumer. Problem solved,

right? Well with such a solution microfibers are released into waterways through washing, polluting a natural resource we all rely upon. Similarly, with fashion rental, there is still the impact of dry cleaning chemicals and travel. It's a start, though it has to progress from beyond less negative impact like problematic recycling otherwise we will still arrive at the same point of natural capital bankruptcy in the destruction of our biosphere.

Neutral is not enough

At the tipping point between less bad and real good is neutrality, like carbon neutral. Though the natural capital that makes up our biosphere is more than a carbon footprint. The air we breathe and the water we drink beckons all ecosystems to function at regenerative capacity. So we can't create a carbon-neutral t-shirt that's made in modern slavery that still uses toxic dyes, which are released into waterways causing dispersed ecological degradation. All capital, including carbon, is part of an intertwined biosphere. It's important to look forward with a vision of solving the greater problems generated by linear fashion, though the path of transformation is walked one step at a time. However, if we claim one step in the right direction to be the saving grace of our natural world, then how will greater steps of change be communicated in future when creating circular fashion? The loss of trust with consumers must not be undermined nor the messaging taken lightly. The world today is less circular than it was a year ago at 8.6% rather than 9% the year previous according to Circle Economy's The Circularity Gap Report 2020. The tectonic shift into circularity needs to be outlined as a systems change, not over-promised product change. Accountability falls upon us all to advance circularity rather than just await its arrival upon shop shelves. If we heed this challenge in fashion together, great ground can be gained to propel us into the next regenerative phase. The exponential traction of Slow Fashion Season, a campaign run by crowd acting organisation CollAction, has seen the desire to reduce carbon and resource impact spread and gain great support through not purchasing new clothes for three months from end of June to end of September. In 2018 2,625 people signed up, in 2019 14,487 and in 2020 the goal is 25,000. The collective impact is impressive, this year's season is looking to prevent 2.5 million kilograms of CO_2 generated from new garment purchases. However, it is only able to overcome linearity by promoting the second-hand fashion economy. Repairing the degradation of natural capital from seasons past, in between, and the negative impact embedded in the garments being circulated on is a question that remains unanswered by the pursuit of neutral impact.

Supply regeneration

To fashion a future that is powered by a circular economy, and addresses its destructive past, we need to create regenerative systems. There's no long term logic as to why new apparel that generates around $1.4 trillion in sales annually, according to Common Objective, should roll the dice on what is a priceless biosphere bank as all living organisms rely upon it for life-giving resources. The reality is that we can print financial capital out of nowhere but the road to recovery for natural capital is a long winding one at best. So do we let our fashion industry that clothes us take a chance on our long term survival through undermining what feeds us and lets us freely breathe? The majority of clothes we buy we don't wear. To say those who are over-consuming cannot afford to pay the true cost for regenerative garments is, therefore, a myth, and so, in turn, is the thought that businesses cannot shift into making such product at scale. The awareness in 2020 that we live in vulnerable times is inescapable due to catastrophic events like the bushfires in Australia over the last summer, and current global health risks like Coronavirus that are having an on flow effect to markets around the globe. The desire for resilience towards climate change and our global supply chains is increasing, and regenerative systems offer the opportunity to meet this emerging need to experience abundance through positive impact. So giving back through the circular economy looks to become best practice for fashion to create clothes that enable their customer to show the world they're for our planet and it's future.

More links

Fashion Revolution: https://www.fashionrevolution.org
ThredUp: https://www.thredup.com/resale?tswc_redir=true
Circle Economy: https://www.circularity-gap.world/2020
CollAction: https://collaction.org/projects/slow-fashion-season-2020/174/details
Common Objective: https://www.commonobjective.co/article/the-size-of-the-global-fashion-retail-market

NATURE-BASED SOLUTIONS TO 21ST CENTURY CHALLENGES

ROBERT C. BREARS

Mark and Focus, Vol 3, Issue 1

Psychology and climate change

By Lauren Nicole Core

Technical Specialist, Multiple Organizations

A recent survey suggests that a majority of United States citizens now view climate change as the single most serious problem facing the global population. This reflects a worldwide trend toward greater acknowledgement of climate change and greater acceptance of its consequences. In turn, these factors hold some promise that effective political pressure may be brought to bear on leaders of the countries most responsible for the human causes of climate change and therefore best positioned to address it decisively and effectively.

If global action relies on political will, and if political will is beholden, however variously, to public sentiment in most of the world's largest producers of carbon emissions and other agents of climate change, it follows that the psychology of both individuals and entire societies plays a significant role in determining not just our personal responses toward climate change but our response as a species as well.

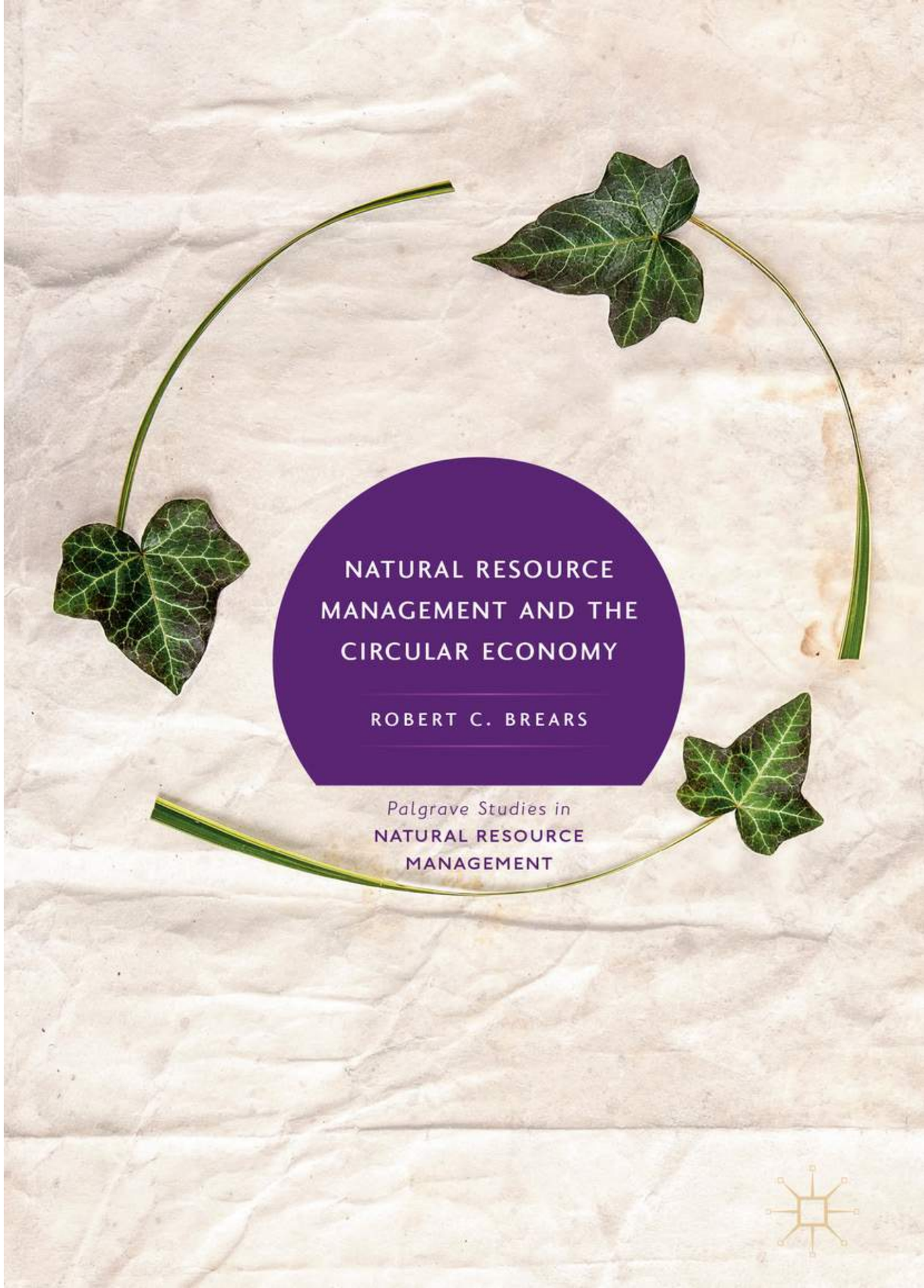
Psychology is increasingly occupied with the psychodynamics of individual and group response to climate change. At this point, the psychology of climate change necessarily concerns itself with identifying barriers to acknowledgement, acceptance, and action. While many individual and regional responses to climate change have been heartening and productive—Copenhagen, for example, has taken bold, practical, and effective steps toward fulfilling its goal of becoming the world's first carbon-neutral capital by 2025–the global response has not been consequential enough to provide examples of positive psychological factors that have translated into globally meaningful political and diplomatic action.

Research published in 2011 by The American Psychological Association describes a sequence of 13 psychological barriers to action on global issues like climate change. The sequence was published at a time when climate change had not taken on the urgency that it has today, and the report in which it appears, while allowing for optimism, focused largely on the negative psychological and psychosocial impact of environmental crises. It is perhaps even more relevant today, now that climate change is a central concern for many people who have committed themselves to taking meaningful action to address it, and is worth consideration as a guide to the inter-

action of psychology and climate change.

Grouped for the sake of discussion, the sequence includes six phases.

- **Ignorance, Uncertainty, and Mistrust**. We may be emerging globally from this phase. As more people experience the effects of a changing environment and learn to connect the changes they see to global rather than regional factors, a critical plurality of individuals acknowledges the reality of climate change.
- **Denial and Judgmental Discounting**. A Pew Center survey conducted in 2006 found that climate change ranked 19th on a list of the 20 most important issues to respondents. Those issues included domestic ones, but the same survey showed that merely 41% rated climate change as a "very serious" problem, irrespective of context. As we have seen, sentiment in the US has swung decisively in favour of acknowledging climate change. Even after denial is overcome, individuals may tend to discount distant or future risks.
- P**lace Attachment and Habit**. The APA identifies place attachment as the first sociopsychological step toward taking decisive action on climate change. We are likelier to act when a global problem affects the places and people to whom we are attached than when we fail to perceive its local effects. This step is a key bridge between personal beliefs and behaviour and those that reflect an individual's membership in a group (or, indeed, a species). In psychological terms, this acknowledges a proximal, or local, context for choosing behaviour; in terms of this sequence, it represents an expansion of the context in which individuals form beliefs and choose behaviours regarding climate change. The limits of this expansion are often seen in reversion to habit: the habits we form prior to developing place attachment around an issue can retain their power afterwards.
- **Lack of Perceived Behavioral Control and Perceived Risks from Behavioral Change**. These steps represent hesitation to act after accepting the reality of climate change. They may also represent the psychologically relevant move from accepting climate change in its proximal context to fully acknowledging it in its broadest context. For many, this is the point at which climate change is truly felt as an existential crisis. At this point, they may feel that their individual behaviour can make no impact on the collective behaviour causing the problem, or that changes in their behaviour may carry untenable risks to their livelihood and sense of well-being. "Eco-anxiety," a term only coined in 2017, may reflect the crucial numbers of individuals who have reached this step, however uncomfortably. Not everyone needs to complete this entire sequence; after overcoming the obstacles represented by this stage, many are spurred to substantial and meaningful action. Enough citizens of Copenhagen have done so to have returned Lord Mayor Frank Jensen's party to power twice since his first term in office, an endorsement of his ambitious efforts to combat climate change.
- **Tokenism, Social Comparison, and Conflicting Goals**. When individuals acknowledge the need to act on the threat of climate change, they may begin to act in ways that betoken an interest that is of great psychological importance to them, but which accomplishes little of practical value. These token efforts may even invite a rebound effect which offsets their practical benefits: the owner of a new hybrid car may feel license to drive it far more than the gasoline-powered one it replaced. The rapidly growing human population may be the grandest example of this rebound effect. This step is often followed by an urge to compare one's efforts with those of others. Such comparison can validate an individual's early efforts to contribute to a global solution, but it can also represent an obstacle: when the reputations of others, particularly celebrities, are believed to exceed their actual contributions, comparison can be used to justify inaction. The negative use of social comparison speaks to a universal fact: we all value some goals that bring us in conflict with the most environmentally sound options available to us. These conflicts may never be resolved, and indeed may predate the measurable contributions of human beings to climate change. They must instead be reconciled. A similarly reconciliatory approach toward the efforts of others is also crucial. Water-resilience efforts in Mali, let's say, may require construction projects that add carbon dioxide to the atmosphere. They also represent important efforts to accommodate climate change, efforts that even in the absence of environmental crisis teach us a great deal about how to manage natural resources more wisely.
- **Belief in Solutions Beyond Human Control**. This step has an uneasy place in the sequence since it can affect belief systems and decision-making regardless of how many other obstacles to action have been cleared. For religious or philosophical reasons, some individuals find themselves able to acknowledge the reality and consequences of climate change but compelled to identify forces outside humanity's control as the only ones capable of resolving it. This need not represent a deus ex machina; some people are simply resigned to nature doing what it will, regardless of what that means for life on our planet.



Leadership to address urban environmental challenges

By Fatime Barbara Hegyi
Joint Research Center, European Commission

The scale of response required for current environmental challenges requires the reinvention of established economic, social and political conventions from consumption through investments, travel, social interactions to decision making [1]. Leadership has been recognised as an important factor in achieving growth and development at regional or local levels [2] and effective leadership contributing to the success of places [3]. Given the nature and urgency of the problem, when addressing grand challenges related to environmental change, policies and related actions also refer to challenges of leadership in terms of capabilities, legitimacy and credibility [4,5].

Therefore, it is important to analyse the context and impact of leadership at the urban level in actions addressing specific agendas related to climate and environment. It is crucial since cities are often the first responders of climate emergencies, while urban decisions have tremendous impacts on climate. Likewise, at the city level, clear leadership in addressing environmental challenges can be identified as certain cities are on the front line of sustainable development efforts. In such cases, the impact of leadership on the motivation and commitment of stakeholders in specific actions can provide an insight into how leadership contributes to transforming places as well as organizations and capabilities [6]. Such transformations enable places to adapt to social, economic and environmental changes.

Leaders need to be able to drive change effectively [7]; something long recognised in the business sphere. Addressing change is a confronting phenomenon that allows leaders to meet the demands of stakeholders involved to meet the demands of the future. In this case, it means safe and resilient cities offering a liveable and healthy environment that is built together with its citizens. Currently, the demand for change as regards to environmental actions is coming more from subnational, local and/or community-led actions [8]. Addressing challenges of climate change require new leadership capabilities surpassing institutional boundaries. The focus is on leadership that is matching ‘goals, ambitions and destinies we

foresee for ourselves' [9], signalling the emerging need of adapting new approaches of leadership with diverse qualities that promote and enhance urban agendas addressing environmental challenges. Assessing the impact of an adaptive, integral and relational leadership can enhance change while achieving legitimacy, credibility. Integral leaders demonstrate 'leadershift' which is a phenomenon allowing leaders to become the architects of organisational renewal [10].

Throughout the whole policy cycle, from design and implementation to evaluation, the alignment of diverse actors leading towards specific policy objectives require a new understanding of the impact of leadership [11]. For transformative and multi-actor strategy processes – just like in case of environmental actions – the elements of new forms of leadership need to be analysed [10] along with the impact of leadership on the motivation and commitment of stakeholders involved. Consequently, a place-based leadership approach serves to reach over organisational and sector-based interests [3,12]. In the case of grand challenges, many territories lack the vision that would lead to transformational processes. Thus to be able to find new development paths addressing these challenges, policy processes need to be widened by transcending organisational borders, thereby allowing the "non-usual suspects" participate in the policy processes [13]. By crossing organisational borders, policy institutions get exposed to external practices and experiences, including governance and leadership [14]. When considering urban systems, a shift can be observed in the value network structure and the type of actors involved, as innovative local communities are addressing local challenges that contribute to a more sustainable form of urban living, thereby reinventing the places from bottom-up [15,16].

Impact of leadership in transforming places

Place leadership contributes to improve the capacity of generating a future-oriented vision and to enhance the possibility of realizing this vision through the interaction of influential individuals; some with formal, others with informal powers [17,18]. Moreover, it reflects the process of reconciling diverse interests of stakeholders to serve a common environmental agenda of a territory. Accordingly, place leaders are "contextually embedded agents who are able to identify, communicate, translate and influence place specific challenges and opportunities" [19]. Place leadership embraces a broader scale of social and economic co-development process, which "incorporate a wide range of power and resource-related, individual and community based agendas as well as negotiations across wide spectrum of people, organizations, disciplines and professions [20], which is necessary in case of tackling environmental challenges. Place leadership contributes to the structuring of social action that is directed to impact social networks, institutions and actions framing essential factors in which environmental actions are embedded [21].

Territorial development strategies are more successful in certain places due to better adaptation to changing social, economic and environmental changes and challenges. One of the reasons is due to their leaders' successfully facing complex issues and systems, including governance [22]. Governance structures are increasingly adopting place-based approaches, especially less centralized ones [23], as governance systems define the scope of place-based leadership at sub-national levels [17]. Furthermore, decentralized governance systems are better suited for place-sensitive strategy processes and related leadership than centralist ones [17]. Leadership is a central factor of governance systems, whose structure can enable or limit leadership [3,24].

Previous research argues that the lack of legitimate leadership causes the differences among regions in their capacity to implement impactful strategies [25]. In parallel other research proposes that lack of collective leadership hinder territories to formulate the needs of the territory, which limits the efficient mobilisation of stakeholders [26]. Therefore, it is crucial to be able to measure the impact of leadership on commitment and motivation of involved stakeholders to ensure efficiency, sustainability and success of urban environmental objectives [27,28].

Adapting leadership impact assessments to urban environmental agendas

Leadership assessments are widely used in the business sphere, most of them offering assessment for a single entity. Previous research has examined the role of good governance and leadership contributing to the overall sustainability and viability of interregional innovative actions and has developed an assessment framework to measure the impact of leadership on such collaborative actions [27]. The starting point of this research has been that collaborative actions led by visibly focused and determined lead actors with a well-defined governance structure are more likely to be successful in attaining their objectives [3,24,25]. The paper explored how the leadership of the cross-border collaborative actions affect the motivation and commitment by comparing attitudes of leaders and stakeholders and analysed how and when to provide feedback for more effective operations. The assessment framework has been developed to assist leading stakeholders to ensure efficiency, sustainability and success of their actions in achieving their objectives. Based on conceptual frameworks for leadership and attitude assessment existing in the business world, the paper proposed an assessment framework. The proposed assessment framework highlights areas of leadership where adjustments or changes are needed to contribute to the viability of cross-border collaborative efforts. Through such assessment, specific areas can be highlighted, where there is a lack of motivation and commitment towards the action, the leadership, the team or the work itself. The framework offers the possibility of measuring the effects of leadership practices on previous decisions. In the case of the piloted actions, it has been confirmed that the management of the network relies mostly on the assigned leadership. Furthermore, the effectiveness and efficiency of the 'joining function' are very much dependent on the ability, commitment and capacity of few actors [28]. If one agrees with Sotarauta and other scholars that "place leadership is the missing piece in the local and regional development puzzle [29], then it is crucial to adapt and regularly use leadership impact assessments - widely used in the business arena - to public policy settings.

Given the importance of influencing power in case of urban environmental agendas, place leaders need the ability to transform and effect thinking patterns and collective actions across and outside of institutions. These abilities include the ability to form a vision, to communicate that vision, to provide adequate responses to stakeholders' divergent needs, and to understand and to make understand the purpose of measures, directions, and roadmaps.

Conclusion

Place leadership is a collective form of agenda shaping linked to a specific place and context. It contributes to transforming places as well as organizations and capabilities [6] and enables places to adapt to social, economic and environmental changes. Place leaders impact environmental agendas of cities by "inviting them into a new visionary context for future change" [30]. Urban climate agendas involve multi-organisation and multi-actor processes striving for change; a road paved with 'shaky trust, fear of losing autonomy, a multitude of communication problems and the inevitable differences in individual visions and interests' [31]. As the literature suggests, that place leadership does not bring immediate impact, but shapes institutions and attitude for future development, accordingly it is a crucial factor in stimulating and mobilizing environmental agendas [32].
Place leaders aim to drive formal decisions and resources to influence mindsets and networks [29]. Influencing mindsets in case of transformative measures in urban environmental agendas calls for collective action, through which belief systems or thinking patterns can be affected. In case of environmental agendas, place leaders need to exercise "interpretive power that does not seek consensus but represents a never-ending endeavour to create fertile soil for concerted thinking and a collective push to transform institutions for the future" [29]. The impact of leadership in urban environmental agendas should, therefore, be assessed in a way that covers the dynamics of such shifts, and in a way that assists leaders in providing timely and adequate responses to environmental change supporting a more efficient and more sustainable urban environmental policy. I wish to finish the article by quoting Sotarauta that fully grasp the type of leadership required when addressing grand challenges: "in the hands of skilful place leaders, vision is a powerful tool (that is) not only about communicating desired futures, but also something to fight and argue about, to support or to attack" [11].

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Mark and Focus

The world faces a variety of mega-trends in the 21st century.

Mark and Focus covers both the risks and opportunities these mega-trends provide to business, governance, and society

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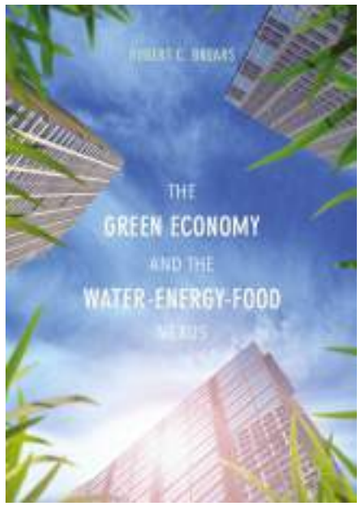

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Environment : Environmental Management

Brears, Robert C., Mitidaption, Christchurch, New Zealand

The Green Economy and the Water-Energy-Food Nexus

- **Presents a series of case studies that illustrate how cities, states, nations and regions of differing climates, lifestyles and income-levels have implemented policies to reduce water-energy-food nexus pressures**
- **Discusses the components of the food-water-energy nexus and the pressures it faces from rapid economic growth and climate change**
- **Provides a review of the various fiscal and non-fiscal tools available for reducing the global demand on the water, energy and food sectors**

This book argues that a variety of policies will be required to create synergies between the water-energy-food nexus sectors while reducing trade-offs in the development of a green economy. Despite rising demand for water, energy and food globally, the governance of water-energy-food sectors has generally remained separate with limited attention placed on the interactions that exist between them. Brears provides readers with a series of in-depth case studies of leading cities, states, nations and regions of differing climates, lifestyles and income-levels from around the world that have implemented a variety of policy innovations to reduce water-energy-food nexus pressures and achieve green growth. The Green Economy and the Water-Energy-Food Nexus will be of interest to town and regional planners, resource conservation managers, policymakers, international companies and organisations interested in reducing water-energy-food nexus pressures, environmental NGOs, researchers, graduate and undergraduate students.

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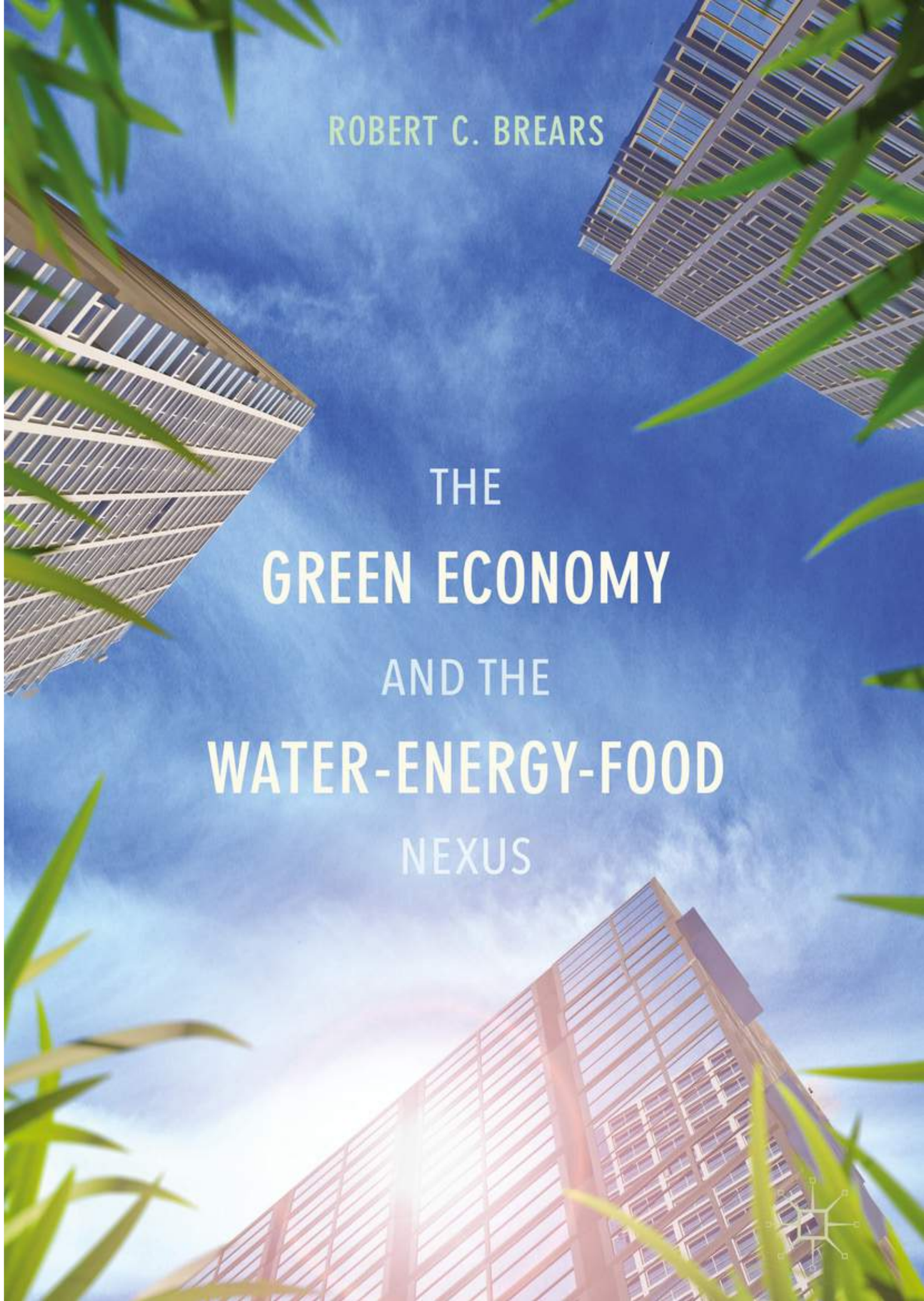

Building the future of protected areas with local stakeholders

By Alberto Arroyo Schnell
and
Barbara Battioni Romanelli of IUCN

Finding ways to identify and balance the different visions about the future can be a solution for better management of protected areas.

What is the issue?

It is by now undisputed that our global plan to address biodiversity loss, the so-called Aichi targets of the Convention on Biological Diversity, won't be achieved by 2020. On top of the climate crisis –the other crucial environmental challenge of our time– our planet is facing an unprecedented crisis, with a large number of species close to extinction. This crisis goes beyond an ethical consideration (can we allow the loss of other species under our watch) to an issue of survival. Many of the species that humans depend upon for survival are at risk – we cannot afford the loss of other species under our watch.

Protected areas are one of the key solutions to address this challenge: they are vital for biodiversity on a local and a regional level. Currently, protected areas cover slightly over 15% of land and inland waters and 7% of the world's oceans.

Identifying and designating these areas is just the start of the work: protected areas face several challenges and threats, such as habitat fragmentation, invasive species, diseases, pollution, drought, wildfire and a rapidly changing climate. Another major challenge is finding the balance between the conservation of biodiversity, and providing the basis for the social and economic development of local residents. One of the main actors of nature conservation are those residents and industry groups that live on, use or benefit directly from the areas where key biodiversity is, including protected areas. But while the agreed conservation targets can only be achieved with their engagement, often these stakeholders do not take responsibility for these targets. This remains a huge challenge and is surely one of the important reasons why we are failing to reach our targets.

What is our solution

The ENVISION project, funded through the 2017-2018 Belmont Forum and BiodivERsA joint call for research proposals, is researching approaches for recognising all stakeholders' vi-

sions of the future in the planning and management of protected areas. It supports the development of an inclusive approach to the management of protected areas, known as inclusive conservation, with the aim of improving biodiversity and human well-being. Inclusive conservation is an approach for accommodating and balancing different visions for protected area management and for achieving socially relevant, economically productive and environmentally sustainable outcomes in protected areas. It has the potential to integrate multiple visions for growth, development and the conservation of protected areas. A cornerstone of inclusive conservation is the application of multiple methods that function to expand the space for engagement and dialogue across the various stakeholders of a protected area, such as recreational users, local residents, local businesses, land managers, farmers, researchers, and local governments. The approach involves considering multiple visions for protected area management, assessing the consequences of each vision, social learning and collectively defining new visions, assessing uncertainty and building resilience, acknowledging power relations and rethinking governance, and informing biodiversity and protected area management policy.

In partnership with local residents, protected area managers and diverse industry groups, ENVISION is examining the consequences of multiple visions for protected area management in four case study areas, three in Europe (Spain, Sweden and The Netherlands) and one in the United States (Alaska). Several interviews have been conducted across the sites with members of the local knowledge alliances, in order to better understand how their knowledge and values relate to their visions for protected area and integrated landscape management. To carry out the interviews, a special tool was used: STREAMLINE. This is a bespoke scientific interview format that can be tailored to the needs of individual research projects. STREAMLINE is made up of a series of 'canvasses' set in the future: throughout the interview, participants are invited to imagine they are stepping into a time machine, travelling to a year in the future, and envision what their life would ideally be like. The first results from these interviews show that what matters to individuals when envisioning the future of landscapes in their region, are above all biodiversity and recreational values.

Next steps

ENVISION's results make us understand how much biodiversity is a fundamental value for most stakeholders, and therefore how important it is to protect it for our own good and for future generations. This is particularly relevant considering the important decisions about biodiversity that are about to be taken: 2020 is a crucial year for nature and biodiversity, as the international community, in the context of the Convention on Biological Diversity, will lay out a new Global Biodiversity Framework post-2020 at the 15th Conference of the Parties to the UN Convention on Biological Diversity, expected to happen in Kunming, China, in October. On this matter, the European Union is also in the process of developing a post-2020 biodiversity strategy, in the context of the European Green Deal. Considering the scale of the challenge, strong and much more effective actions will be needed to set the path to a sustainable future.

In this context, the upcoming strategies should place a special focus on effective management and implementation of protected areas, beyond quantifiable percentages. This will necessarily include enhanced solutions towards a stronger ownership of the conservation targets by crucial stakeholder: inclusive conservation can be a helpful tool to this end.

Further information

For further information about inclusive conservation and the ENVISION project, please contact:
Alberto.Arroyo@iucn.org or go to www.inclusive-conservation.org

ENVISION

PALGRAVE STUDIES IN CLIMATE RESILIENT SOCIETIES
SERIES EDITOR: ROBERT C. BREARS

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Developing the Circular Water Economy

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Developing the Circular Water Economy

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Atmospheric Water Generation: Pure Magic?

By Doug Woodward
Independent consultant and a company director

The following article considers the fast-approaching world-wide freshwater crisis that is faced by us all and examines a new technology that has been developed by Hogen System's to help address this.

Our Blue Planet

Viewed from space, Earth looks like a blue marble with white swirls. Some parts are brown, yellow, green and white. It floats like a bright jewel set against the infinite blackness of space. The blue part is water which covers most of Earth and which makes it unique amongst the planets in our solar system for having water in liquid form on the surface, in an amount conducive to the evolution of life. Earth is the only planet in our solar system that has a significant amount of liquid water. About 74% of the surface of Earth is covered by it in liquid or frozen form. Because of this, we often call Earth the Blue Planet. And it is only because of its water that Earth is the home to millions of species of plants, animals and to Man.

Yet despite this proportion of water, the earth remains a fragile closed ecosystem in which freshwater remains one of the most limited and essential of commodities. While much of the world is covered by water, only 2.5 percent of this is fresh. The rest is saline and ocean based. Even then, just 1 percent of our freshwater is easily accessible, with much of it trapped in glaciers and snowfields.

The water we drink today has been around in one form or another since the days when dinosaurs roamed the Earth, hundreds of millions of years ago. But while the amount of fresh water on the planet has remained constant over time — continually recycled through the atmosphere and back into our taps — our population has exploded, meaning that every year competition for a clean, copious supplies of water for drinking, cooking, bathing, and sustaining life intensifies.

With our exponentially growing population of 7.7 Billion and counting, we are fast approaching a freshwater crisis. There is the same amount of freshwater on earth as there always has

ATMOSPHERIC WATER GENERATION

been, but our population's explosion leaves the world's water resources in a crisis. With around just 1 percent of our freshwater easily accessible, in essence, only 0.007 percent of the planet's water is available to feed and fuel our vast and growing population, which is forecast will reach 10 Billion by the year 2050.

Water scarcity is currently an abstract concept for most of us in the western world, a resource that is often simply taken for granted. But is a stark reality for many others, the result of a multitude of geographic, environmental, political, economic, and social forces. Geography, climate, engineering, regulation, and competition for resources, make some regions comparatively rich with fresh water, whilst others face drought and debilitating pollution. In the developing world, clean water is often either hard to come by or is a commodity that requires laborious work or significant money to obtain.

Water is life

Wherever there are people, they need water to survive. Not only is the human body 60 percent water, but this crucial resource is also essential for producing food, clothing, manufacturing, moving our waste, and keeping both the environment and us healthy. Unfortunately, man is not an efficient water user. (The average hamburger takes 2,400 litres, of water to produce, and many water-intensive crops, such as cotton, are grown in arid regions). According to the United Nations, water use has grown at more than twice the rate of population increase in the last century. By 2025, an estimated 1.8 billion people will live in areas plagued by water scarcity, with two-thirds of the world's population living in water-stressed regions as a result of use, growth, and climate change. The challenge we now face as we head into this future is how we effectively conserve, manage, and distribute the water we have. And with this growth of our population, we have seen the rise of the megacity - usually defined as a metropolitan area with a total population of over 10 million people. Right now, there are some 47 megacities in the world, of which three have over 30 million residents: Tokyo, Shanghai, and Jakarta. The largest megacities in each continent are Tokyo in Asia, New York in North America, São Paulo in South America, Lagos in Africa, and Moscow in Europe. With consumption increasing exponential in line with population growth these conurbations place massive demands on the finite resources and ecosystems that surround them. These cities already massive water and wastewater infrastructures are struggling to cope. Sao Paolo, for example, one of the world's fastest-growing megacities with a population of some 22 Million is already running out of water and has experienced its reservoirs running dry. Furthermore, the water that runs from its taps is not safe to drink without further filtration, which has caused residents of more affluent apartment blocks to bore their own wells to secure their own private clean water supplies, thus further depleting the aquifer.

How much water do we need?

The World Health Organization (WHO) states that for basic survival, each human needs 15 litres per day of potable water, this includes drinking, basic hygiene and basic cooking needs. There are many different opinions on how much water we should drink every day. The general recommendation for adults and children is to drink at least 2 litres of water per day. However, for those with physical jobs, exercising or living in hot climates, more is needed – up to 4 litres or more. But the water we actually consume is just the tip of the iceberg. Estimates vary, but typically the current average daily water consumption is around 340 litres per person or 900 litres per household. The largest use of household water is to flush the toilet, and after that, to take showers and baths. This is why, with the now widely recognised need for water conservation, we are starting to see more toilets and showers that are designed to use significantly less water than before. The resource is too precious to simply allow it to be squandered inefficiently and in effect go straight down the drain. Indeed, many local governments now have regulations that specify that water faucets, toilets and showers only allow a certain amount of water flow per minute.

Innovative solutions

As described above we are already seeing innovative steps being taken to minimise the amount of water we use, from flow regulators to non-stick nanometric coatings for toilets thus reducing the amount of water needed to flush them clean. The traditional water infrastructure requires a massive infrastructure for its systems of water supply, treatment, storage, distribution, water resource management, and flood prevention. These systems place their own demands on their local ecosystem, ranging from the obvious effects of constructing dams, canals and treatment plants to the impact of the mains distribution systems used to deliver clean water to the consumer and the reclamation systems used in turn to remove the wastewater and treat it.

Inevitably this costs both financially and environmentally and is only geared towards centralised urban conurbations. But is there a better way to obtain a safe and secure supply of potable water where traditional infrastructure is not viable and/or to supplement supplies where the purity of delivery at the point of consumption cannot be guaranteed via the mains?

H2OGeneration

Hogen thinks "Yes". If you live 'off-grid', somewhere where there is no infrastructure, or the quality of the water delivered is simply not safe to drink and you have to think outside the box… And outside the box is air. The very atmosphere we breathe contains moisture locked in as vapour content, corresponding to varying degrees of humidity depending on where you are in the world and atmospheric conditions. This 'invisible water' is essentially there for the taking – if you use the right technology. To provide water for our future Hogen System's mission is to generate the highest quantity of water in the most efficient, cost-effective, environmentally friendly and sustainable way, directly from this surrounding air, thus ensuring safe clean drinking water is always available, anywhere in the world.

Water from air

Hogen Systems have developed an Atmospheric Water Generator (AWG) that extracts the water from the surrounding atmosphere to produce safe clean drinking water on-site using a unique, patented technology. By using an intelligent control system Hogen's Water Generators produce the highest amount of potable water using the least amount of energy. Water is extracted from the surrounding atmosphere using an optimized combination of condensation and absorption technologies. The extraction process is dynamically optimized using an intelligent control system that 'senses' the environment and puts the unit into the optimum operating mode to generate the maximum water output in the most efficient way. This allows the optimum process to be established for any mission conditions.

Intelligent water generation

The process can essentially be considered in three stages: Atmospheric induction, water extraction and separation, and UV Purification, filtration and Storage. The control systems sensors monitor the surrounding atmospheric conditions to determine if condensation and/or absorption into desiccant material is required for optimum efficiency. Many benefits accrue from Atmospheric Water Generation including suitability for use anywhere in the world, is ideal for off-grid residences, remote facilities and expeditions, it enerates pure potable water cost-effectively, it minimises environmental impact by eliminating the need to transport and store water, the water is produced at the point of use (this eliminates the need for traditional abstraction, filtration systems and chemical dosing, minimises the risk of water contamination and completely eliminating losses caused through leaks in conventional distribution systems, and assured Water Quality is guaranteed – Hogen works with an external body who test our water to ensure we meet national and World Health Organization (WHO) standards.

Where can this technology be used?

Hogen's Water Generators are suitable for use in a diverse range of applications. With a range of modular water generation solutions ranging from our Compact and Midi product range up to our large installation Maxi units, we have a scalable solution for you whatever your need. Examples of where atmospheric water generation can be effectively used include remote locations such as offshore oil and gas rigs, remote facilities in the desert, military deployments, disaster relief applications, remote of grid private properties, domestic properties with poor quality supplies and even superyachts and nuclear bunkers. Hogen Generators can be supplied for use anywhere in the world that has a power source available.

Conclusions

In a world facing a freshwater crisis, potable water is going to become an ever more precious commodity. Solutions that can generate this resource in a sustainable cost-effective way with minimal environmental impact will be crucial. Atmospheric water generation provides one of the best solutions to achieve this aim. Flexible solutions such as those offered by Hogen Systems allow water to be created and delivered right at the point of demand. No complex infrastructure, simply 'power-up', and the water will be generated out of thin air. The work of a magician? No. The result of a highly effective and unique appliance of science and technology? Very definitely Yes.

Mark and Focus, Vol 3, Issue 1

A global commitment to water challenges

By Laura F. Zarza
Content Manager at iAgua.

Although climate change is already referred to as the challenge of our time, with ever-increasing economic, social and environmental impacts, water management is one of the most important challenges the planet has to deal with in the coming decades. In fact, according to UNDRR, 90% of natural disasters are related to water.

Although — for now — there is enough water in the planet for the 7 billion people that live in it, its uneven distribution, our unsustainable management, and the mentioned impact of climate change mean that water scarcity already affects one in four people. To this, we need to add that, according to the UN, three in ten people lack access to safely managed drinking water services and six in ten people lack access to safely managed sanitation facilities. In addition, the Water Resources Institute (WRI) Aqueduct Water Risk Atlas finds that 17 countries, which are home to a quarter of the world's population, face 'extremely high' water stress, with agriculture, industry, and municipalities using up to 80 per cent of available surface and groundwater in an average year.

Given these numbers, we cannot deny nor exaggerate the importance of water resource management for the future of mankind. The truth is water is at the core of sustainable development. The cross-cutting nature of SDG 6 on 'Clean water and sanitation' for the achievement of the remaining SDGs, mainly those relating to health, education, economic growth and environment, make water a major factor for the socio-economic development of different regions in the planet. Water and climate change can no longer be dealt with separately when we talk about human development, and the commitment can no longer be a local one: it must go beyond boundaries and be addressed jointly at the global level.

Water use and consumption have grown twice as fast as the population growth rate, and the global water demand (in terms of extraction) is projected to increase by some 55% by 2050. Therefore, ensuring the water security that the global population demands require joint discussions on sustainability strategies, taking into account the resources and conditions of each of the countries; cooperation between them is also

key. Proper water management, particularly in cities, is complex and requires coordination between sectors and local authorities to focus strategies on a more sustainable and equitable use of water resources. Among those strategies, new technologies and digitalisation offer a broad range of opportunities to face the potential waves of water crises that, as scarcity or water pollution, are taking place and have done so for years now.

In this regard, governments, public authorities and companies must commit to a transition to a circular economy model, where water is used as many times as possible, turning to other sources such as desalination and reuse; where different water qualities are allocated to different uses — industrial, agricultural and urban — depending on the parameters established by legislation; and where resources are recovered from wastewater as much as possible. However. according to the working group on 'Water and the circular economy' of the CONAMA Foundation, this transformation of the water management model also poses a series of problems: concerning access to financing both when it comes to project implementation as well as for project long term viability, which is difficult; the need to reformulate and review regulatory frameworks; and also concerning distrust and social acceptance of advances in this regard.

New technologies have a role to play in this paradigm shift: they are key not only for the success of the circular economy in the water sector but also for the optimisation of water use in other sectors. The digital revolution is an undeniable and tangible reality, as much as climate change is, and provides us with the tools we need for the sector to manage water as efficiently as possible. Information technologies, such as big data, the Internet of Things (IoT), machine learning, digital twins or artificial intelligence are some of the tools that allow having data that previously we could not extract, processing all the information at breakneck speed and improving production (and predictive) processes in a way we had never imagined.

If the circular economy is about 'doing more with less', new technologies are about 'doing it better'. With that vision, both the public and private sector must vouch for innovation, in such a way that, throughout integrated water cycle management, the environmental and economic benefits are maximised. These two aspects have social impacts.

In short, water security faces an unprecedented challenge. Only the cooperation between stakeholders at the local, regional and global level will show whether we are truly ready to tackle this new scenario where sustainable development and adaptation to climate change drive the agenda, and to what extent we are willing to change our current behaviour patterns to reconsider water management. Will we be able to do it? Only time will tell, but we don't have much of it left.

About Laura F. Zarza:
This writer by vocation, found in iAgua a way to combine her two main passions: communications and the environment. She works every day to raise awareness about the importance of water for people's lives and to fight misinformation on environmental issues.

Versatile and a hard worker, she is responsible for creating and managing the web's contents and is also in charge of the social media networks strategy.

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Robert C. Brears is the founder of Our Future Water, Mitidaption, Mark and Focus, and is a Director on the International Board of the Indo Global Chamber of Commerce, Industries and Agriculture.

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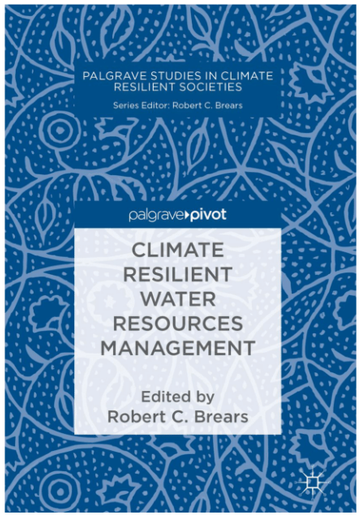

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The FIWARE Community: powering up resilient cities across the board

By Val De Oliveira of FIWARE Foundation

With the world's population skyrocketing and, by default, food consumption rising at an unparalleled speed, natural resources are shrinking. This is, literally, just the tip of the iceberg with regards to the many issues that public administrations are dealing with in times of climate change. The issue unarguably affects all aspects of life and curbs water accessibility, and food production, among many other areas.

Average global surface temperatures and sea-levels have gone up considerably, so did the number of solutions trying to mitigate such effects. In an attempt to tackle contemporary problems stemming from large crowds living in relatively small spaces, smart solution providers have stepped in by introducing innovative solutions, such as smart waste management, intelligent industrial LED lightings, smart irrigation systems, and energy-efficient buildings, to name but a few. These solutions can be taken up by public service providers in an attempt to improve densely populated urban areas, whilst also protecting the environment.

A breeze of fresh news (and air)

As we look into the digital future, with technologies such as big data, AI, robotics, and blockchain shaking up all types of industries and many aspects of our daily lives and thereby, becoming the backbone of our social sphere, ICT-based solutions present themselves as the answer to many contemporary issues. Alone, air pollution from outdoor sources, for instance, annually takes the lives of 3.3 million people worldwide on average and the rates are likely to double by 2050 even if every country on the planet takes on mandatory air-quality legislation.

One of the biggest air pollution culprits is the burning of fuel, both for heating and cooking, as well as intensive agricultural activities, which means the problem takes unparalleled proportionality as population drastically grows in urban areas. In order to reduce air pollution, cities need to understand its patterns, but traditional monitoring stations are either too unreliable or sparse to track down all the many contaminants and accurately forecast air pollution levels. Not to mention

FUTURE RESILIENT CITIES

the financial burden that the setup of such stations can have on - too often - scarce public resources.

Taking that into account, FIWARE Foundation's Gold member Bettair Cities has developed an AI-based, low-cost sensor-platform solution to map air quality in real-time and with a promised +90% accuracy rate (fairly close to what large and expensive air monitoring stations deliver) where traditional air quality sensors stick to a 60% precision percentage. Based on the large deployment of outstandingly accurate gas sensors - by using an advanced post-processing algorithm - this 'Powered by FIWARE' solution provides a highly efficient and large-scale pollution-mapping tool for big cities.

The solution's AI-powered sensors accurately measure 10 air quality indicators, including nitric oxide, nitrogen dioxide, carbon monoxide, ozone, and particulate matters, in the same unit and cost, on average, a fraction of what similar technologies charge.

"Due to the fact that air quality can vary considerably in space and time, dense networks of low-cost sensors have come to be prominent for air quality monitoring since they provide useful data where it is needed the most: adjacent to residents and not somewhere perceived as remote or irrelevant. All in all, the benefits are endless: our technology permits quantifying the impacts of pollution mitigation actions, provides answers to relevant questions about air pollution, establishes more accurate modelling - and forecasts at a local scale -, finds potential air pollution 'hot spots', and increases the ability of links between air quality and human health to be identified" says Sebastiano Meneghello, Bettair Cities' VP of Business Development.

Beyond sensor-based data

The platform also measures environmental variables such as temperature, humidity and atmospheric pressure. It can also measure noise pollution in decibels and can be run on solar power. Beyond the hardware, Bettair's air quality monitoring system incorporates a platform as a solution (PaaS) that stores and processes the raw data collected by the sensors. The company is also adding an algorithm that incorporates additional external data from partners, such as global weather forecast providers, to enable up to five days of air quality forecasts. What makes this solution really stand out is its 'near' real-time feature as it can deliver data every five minutes. Moreover, it is also very easily implemented: Bettair Cities uses electrochemical sensors that can be installed on city fixtures such as lamp posts, for example.

Thanks to FIWARE technology, Bettair Cities can provide customers with a whole platform, not just the data provided by the sensors. For instance, via the heat maps, the solution can show in real-time the status of the air and air quality at a hyper-local level. The solution is scalable, flexible and adaptable to any city so that they can respond to spikes in pollution levels and immediately act to mitigate them. Moreover, in the very near future, these heat maps can help citizens to plan their journey to avoid the most populated routes via an app.

The power of real use cases

The company has pilots integrating a LoRaWAN module (long-range, low-power wireless technology) in the node and it is currently being tested in Southampton, UK and Santander, Spain. Also, another pilot is being carried out in New York together with Columbia University. Large scale pilots are currently planned to start in late 2020 in Barcelona and Roma. The company is holding further municipal trials this year, before fully going into the market next year.

Creating climate-resilient environments surely isn't a simple task but, with the help of IoT and Open Source technologies, devices such as lamp posts - as seen in the Bettair Cities use case - can be further used for environmental gains. In our Climate Change Booklet, FIWARE also features nearly 30 'off the shelf' disruptive solutions from the FIWARE Community that have become vital to the fight against climate change and are, ultimately, setting common standards for Smart Cities.

Collaboration is at the forefront of the smart solutions movement

Bettair Cities is just one outstanding example of how the FIWARE Community is helping cities to deliver their digital vision, focused on sustainability, the efficient management of public services and with a citizen perspective. Based on an Open Source approach, the FIWARE Community is driving the development of smart solutions in a faster, easier, interoperable and affordable way that avoids vendor lock-in scenarios. This is only possible due to the ever-growing participation of internal and external contributors who, together, update and improve the platform.

The concept works because the same contributors then benefit from the work they play a part in. When solution providers can easily build solutions on top of a free and open platform, available financial resources can then be used to boost other aspects of their businesses such as talent acquisition, product line expansion, and the launch of marketing campaigns. Moreover, there are technological gains: as a free software, FIWARE gives developers access to the source code, allowing them to enhance the application performance, add new features, and fix errors, for everybody's benefit.

By making computing safer, interoperable and more democratic, users by virtue hold on to a sense of contributing to a greener and better world. It is this compelling purpose that brings the FIWARE Community to combine their efforts and experiences, and we are not just talking developers here: public administrators, policymakers, standardization entities, testers, writers, engineers, marketers, and designers are all contributing with their time and expertise, reacting to challenges at an incredible speed. FIWARE also collaborates with a multitude of other Open Source communities such as Linux, OpenStack, and Red Hat to provide further value for our members, users and partners.

Interoperability is of essence: FIWARE's unwavering approach to international, open standards

As important as making the most of Open Source technologies is, using such technologies in a standardized way is of higher importance. In order to successfully make it into the smart solutions market today, new services and applications must be able to securely communicate with other services and devices, traversing a multitude of infrastructures and systems. This way, when competing in the Open Source market, business leaders, developers, researchers, entrepreneurs or public administrations can clearly benefit from knowing that their solutions can be connected with other applications or pieces of software already widely available, or that they can replicate them for multiple customers with rather low adaptation costs.

That ability of co-existence and interconnection is what interoperability is all about. By being able to publish and use data in a standardized way, technology users and providers drive new business models, create open ecosystems and help public administrations to deliver more effective public services and hence, boost citizens' living standards. An important element of data models and infrastructures worldwide, common standards are at the heart of platforms and digital infrastructures, enabling interoperability and portability of solutions. By defining and implementing recognized standards that everybody can access, understand and easily implement when building solutions, FIWARE has been accelerating the maturity and adoption of Open Source standards.

Together with its members, FIWARE has already spearheaded several standardization activities, for example, with ETSI (NGSI-LD API specifications), W3C (Web of Things), GSMA (IoT Big Data Ecosystem project), or TM Forum, toward developing uniform data models for areas of application such as smart parking, smart lighting, smart waste management and many more. Only by using uniform interfaces and data models, it is possible to avoid data silos and use public funding efficiently, and hence, create sustainable, smart and resilient cities at an unprecedented speed.

About FIWARE

Founded in 2016 by Atos, Engineering, Orange and Telefónica, FIWARE Foundation is a non-profit organization that drives the definition and encourages the adoption of open standards (implemented using open source technologies) that ease the development of smart solutions across the fields of Smart City, Smart Energy, Smart Agrifood and Smart Industry, based on FIWARE technology.

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Public Space and Public Life

By Helle Søholt
Founding Partner & CEO, Gehl

Now is a great time to plan ahead. Public, accessible spaces for all is not a 'nice to have', but a need for any global city and community to ensure social, cultural, environmental and economical resilience. We need to monitor what is happening right now and learn from the fundamental change of behaviours and mobility patterns, the environmental improvements and hard impact to local community businesses to improve the way we plan for sociability, health and wellbeing.

In just a few short weeks the COVID-19 pandemic has drastically changed most people's relationship with the cities, neighbourhoods and streets in which they live. With each level of restriction imposed on society – from nation-wide lockdown, to 'stay in place' instructions, to closures of various public institutions and private sector businesses – the ability of people, goods and services to operate in a normal way is disrupted, and even halted completely.

Whilst we all understand this disruption is absolutely necessary to prevent the worst public health outcomes becoming a reality, it is nonetheless tragic to see and feel the silence of places that we otherwise know and love as the bustling hearts of our communities. However, and it's a big however! Despite the very natural feelings of worry and sadness we may all experience in these testing times, there comes so many reasons to be optimistic.

As humans, we are already seeing, the most remarkable collective (in)action occurring throughout society, a mental and physical banding together for the public good. It takes relatively no time at all to see our social layers stripped back, revealing a very human, shared understanding of one another that would otherwise be considered to imposing or intimate. Housebound, we see our neighbours 'in the same boat', at eye-level, with new opportunities for empathy and communication – from a wry smile that recognizes our common predicament to offers of help and care amongst those we know as vulnerable, to the pooling of resources along a whole street or block, and new forms of digital socialization. As an urbanist, I know these innocuous gestures and collective actions are gold dust in the formation of strong communities. Catalysing such human connection is what we work

PUBLIC SPACE AND LIFE

for everyday at Gehl, building on the years of knowledge developed by humanistic planners such as Jane Jacobs, William Whyte and Jan Gehl, developing methods to measure people in cities and constantly refining and supplementing this approach through writing, projects and collaboration that continues today.

And so, in the matter of a few short weeks we are reminded what really matters as humans, as neighbours and as part of our various communities – that we are connected, that we do have an impact upon one another, and that we do have a responsibility for one another. At such a critical time for the sustainability of the world, this is a good thing to be reminded of, and one we shouldn't forget when 'normality' returns.

For places, we too are seeing, even in a short number of weeks a remarkable reconfiguration of both physical spaces, and our relationships with them. Nowhere is this more apparent than the rapidly emptying road space in cities the world over. In Italy, the worst hit nation in Europe, we've witnessed a reduction in overall traffic volumes by 65%, and 70% in personal vehicle travel. In the U.S, San Francisco, the first city to rule 'shelter in place' restrictions saw a 50% reduction of traffic volumes in just two days last week (INRIX). So, with vehicular traffic to a minimum, and public transport either running at a reduced service or cancelled, we see many streets in a new light, literally free of traffic and its associated noise and pollutants. This unprecedented change has already catalyzed some to use the opportunity to expand temporary infrastructure provisions for other transport modes.

In the last weeks, Bogotá was one of the first cities to use this time to expand its 'Ciclovia' programme – where selected streets are car free on Sundays – to everyday of the week. Overnight, a vital network of 583 kilometers (wow!) of bicycle, scooter, running and walking inducive streets and bicycle lanes were thus connected. Where it is banned or not encouraged to take public transport at all, these streets are the only way to travel for people required to work on location, as well as a key recreational space for people confined to their own homes the majority of the day and week. Soon after Bogotá, the Mayor of Mexico City announced a citywide network of such streets, and later New York Governor Andrew Cuomo put forward a number of initiatives to expand the cycling network and improve safety for cyclists as mode share boomed across the city. By no means degrading the serious consequences this crisis may have on our cities, it is encouraging to think of the legacy – both in attitudes and physical infrastructure – that these significant bicycle modal share increases will have for cities and all the public life benefits that entails.

From the street to housing, we are also reminded of the value that human scale, shared courtyard blocks have for residents in this time of crisis. For all of their advantages – just take a look at Soft City by David Sim – the courtyard block's ability to provide semi public-private spaces via balconies, edge zones and courtyard gardens are proving critical for people's only access to 'outdoor' life. At a time when personal and communal freedoms are restricted, these spaces give people the opportunity to simply be outside, and to connect partially or fully with neighbours and their close community. Nowhere is this more apparent and publicized (you may have seen the videos of residents singing on their balconies) than in Italy.

There, for instance, we've seen the 'Case a Ballatoio' (Balcony Houses) or 'Case a Ringhiera' (Railing Houses) having been a very popular variation on the perimeter block typology in affordable housing projects in Milan. Now broadly gentrified, they serve diverse demographics in the old town centre, the Ballatoio, that provides both access to the dwellings and visual connection among residents and is the ultimate space of social interaction at the scale of the block.

What examples such as this in Milan exemplify is the importance of our built environment to invite for varied degrees of socialization, to provide open and intimate spaces that encourage connection amongst people, and to ensure the fundamentals of access to sunlight, fresh air, and nature that are all to easily disregarded in modern urban development. With people around the world becoming distinctly aware of the advantages and limitations that their homes and their local environment provide, we have reasons to be optimistic that beyond the crisis, the demand for more human scale, soft, and communal living environments will increase – and that can only be a good thing for the resiliency, health and sustainability of future communities the world over.

So, as we enter the third week of social restrictions here in Denmark, we see glimpses of how this global pandemic could have a silver lining for public space and life the world over – one where public spaces and streets are truly thought of as shared public space, where nature is prioritised and where the right to breathe clean air and feel connected to our communities is at the center of everything we plan in the future.

Information:
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Image credit: A message of hope for passers by in San Francisco. Credit: Sofie Kvist, Gehl

digital-water.city: a European project to leverage the potential of data and digital technologies for urban water management

By Nicolas Caradot of digital-water.city

Smart sensors to monitor water pollution in real-time and help keep your city's river safe for bathing; virtual reality to depict complex industrial processes and help reduce your utility's operational costs; a mobile app to make aquifers visible and help inform citizens about the importance of groundwater: digital solutions are opening up a variety of opportunities for the water sector. In fact, digital water is no longer seen as an 'option' but as an 'imperative' (IWA, 2019) for a more sustainable and secure water management.

European cities face major challenges to provide sustainable water services. Almost three-quarters of EU inhabitants live in urban areas and the trend is increasing. Groundwater and surface water bodies in Europe are over-exploited and under pressure, with less than 40% of them in good ecological and chemical condition. Climate change and the increased occurrence and intensity of extreme weather events will affect the functionality of urban water systems and challenge the capacity of sewer networks. This will raise the pressure on water bodies even further, aggravating disaster risk and raising the cost of meeting related regulatory requirements. Additionally, ageing infrastructures, whose construction generally started at the end of the 19th century, are in urgent need of massive investment to avoid deterioration and increased risk of failure.

The business-as-usual practices in the water and wastewater sector are not sufficient to provide sustainable services. A more sustainable future will only be possible by making the transition to a new generation of urban water systems, one which is "embracing digital solutions and the enabling conditions that can support their effective implementation" (IWA, 2019). Many of these solutions leverage the latest innovations developed across industries and business activities, including advanced sensors, data analytics and artificial intelligence. The potential of digitalization might outweigh its associated risk if digital solutions are successfully implemented addressing a series of gaps and barriers such as ICT governance, cybersecurity, data protection, interoperability and capacity building.

DIGITAL WATER

New opportunities for the water sector

The adoption of digital solutions represents an unprecedented opportunity to create new value and generate additional benefits that go beyond saving money and increasing the efficiency of investment allocation. As it now embraces digitalization, the water sector is transitioning from a historically conservative and risk-averse standpoint to one where it actively explores novel business models, shifts in governance frameworks and expanded technical capacities. Digital systems have the potential to enhance the control of water use, ease the monitoring of systems and processes and so contribute to compliance with EU directives. The ability to process and value large amounts of data, including cross-domain data from other city infrastructures, facilitates management and decision-making both under ordinary and extraordinary circumstances. At the same time, this widens the palette of services that existing and emerging businesses can offer, leveraging novel applications and data products. Digital technologies can also help to automate or reduce time spent on the most unpleasant tasks in the sector, such as sewer defect coding or data collection. Finally, the use of digital interfaces can improve and increase the frequency of interactions between service providers and their customers, which can help raise awareness of water issues and lead to active stakeholder involvement (Anzaldua et al., 2019).

Within this context, the H2020 innovation project digital-water.city (DWC) aims to boost the management of water systems in five major European cities – Berlin, Copenhagen, Milan, Paris and Sofia – by leveraging the potential of data and digital technologies. The ambition is to quantify and communicate the benefits of a panel of 15 innovative digital solutions compared to the current practices in place in European utilities. The full list and presentation of DWC solutions can be found on our website https://www.digital-water.city.

Addressing pressing challenges in Berlin, Copenhagen, Milan, Paris and Sofia

Under the leadership of Kompetenzzentrum Wasser Berlin gGmbH (KWB), 24 partners from 10 European countries and Israel work together to develop new applications for the water sector of tomorrow. Their added value will be showcased with a focus on addressing the pressing challenges of our five utility partners.

In Paris, DWC aims to improve the bathing water quality in the River Seine with a view towards the Olympic games of 2024. This application will deploy sensors for bacterial measurements in the river and use machine learning to forecast the contamination risk at official bathing places. Looking beyond 2024, Paris city and other local municipalities hope preparations in advance of the games will lay the groundwork for permanent and safe bathing opportunities. In Sofia, the main objective is to improve the management of the sewer network and reduce operational costs. This will be achieved by deploying low-cost sensors for the monitoring of combined sewer overflows and smart sewer-cleaning technology. In Copenhagen, the challenge is to reduce flooding and the environmental impacts of combined sewer overflows. This will be achieved through the use of machine learning for flow forecasting and real-time control of the sewer network and wastewater treatment plant. The main focus in Milan is the achievement of safe wastewater reuse and the setup of a system for efficient distribution for agricultural irrigation. A digital platform will be created to manage the irrigation needs of farmers and the quality and quantity of available reuse water from the wastewater treatment plant. In Berlin, several innovations will reduce the environmental impacts of the sewer network by tracking illicit connections and combined sewer overflows. An Augmented Reality application will be used to make groundwater visible to the public and highlight its relevance for drinking water production as a hidden part of the water cycle.

New sensors to measure bacterial presence in rivers and treated wastewater

One of these promising technologies is a new sensor for real-time bacterial measurements (ALERT System), manufactured by the company Fluidion. The device is fully autonomous, remotely controllable, installed in-situ and allows rapid quantification of E. coli and enterococci concentrations.

Ensuring microbial safety is one of the key objectives of bathing water management, and it is also a critical aspect for water reuse. The European Bathing Water Directive uses faecal bacteria levels as an indicator for quality assessment of marine and inland waters. A major challenge regarding bathing water management is that concentrations of faecal bacteria may show spatial and temporal variability. In urban rivers, discharges from overflows and stormwater drains may contain high amounts of faecal bacteria and reduce bathing water quality. Bathing water surveillance in Europe to date has been based only on monthly grab samples, and event-scale variability is detected only by chance as pollution events may occur between sampling intervals.

The ALERT System is currently tested in Berlin and Paris using side-by-side laboratory comparison to understand temporal variability and spatial bacterial distribution in the local rivers (the Seine, Marne and Spree). In Milan, the system is being deployed to provide early warning of bacterial and toxic contamination linked to water reuse at a major wastewater treatment plant. Preliminary analyses have shown that the device shows metrological capabilities comparable to those of an approved laboratory using most-probable-number (MPN) microplate techniques and is suitable for bacterial pollutant concentration ranges such as those found in urban streams and wastewater treatment plants.

The technology opens up new opportunities for the water sector for a range of applications such as the planning of pollution reduction measures, the continuous monitoring of bathing water quality and the assessment of contamination risk by the reuse of treated wastewater for irrigation. In particular, it is a key innovation that can contribute to the objective of Paris city and other local municipalities to provide permanent and safe opportunities for bathing in the Seine river for the 2024 Olympic and Paralympic Games and beyond.

Cooperation at European level

Both utilities and technology providers acknowledge that the success of digitalization depends not only on individual solutions but on their successful integration with the existing systems at the utilities. A crucial barrier to address here is the lack of interoperability between IT systems and the growing amount of data collected by a variety of stakeholders. In this context, DWC will contribute to the development of a reference data model and ontology to simplify the contextualization of knowledge in the water sector. This ontology will act as a unified semantic model to simplify the mediation and interaction between a variety of data and digital solutions. This ambitious task will be tackled in close cooperation with other H2020 projects of the same program, namely SCOREwater, FIWARE4WATER and NAIADES and other European initiatives such as SAREF4WATER.

Fluidion drone embeds a new sensor for real-time bacterial measurements and allows remote sampling and rapid microbiological quantification Copyright: Fluidion

More information

Visit us at https://www.digital-water.city/ and Follow us on Twitter (@digitalwater_eu) and LinkedIn (digital-water.city)

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A greener and brighter future for cities

By Robert C. Brears
Founder of Our Future Water, Mark and Focus, and Mitidaption

Cities are turning to Blue-Green Infrastructure (BGI) solutions that utilize ecosystem services in the management of water resources while providing multiple co-benefits. BGI is a strategically planned network of natural and semi-natural areas that are designed and managed to deliver a wide range of environmental, economic, and social benefits. These benefits include improved water quality (when rain falls on a city's surfaces (streets, sidewalks, and rooftops), it collects oil, litter, and other pollutants as it runs off city surfaces into waterways and so BGI enables cities to capture and clean this stormwater, ensuring waterways are healthier), reduced potential for flooding (BGI slows down and holds stormwater allowing it to soak into the ground. This helps reduce the volume of water entering the sewer system and prevents flooding), enhanced resilience to climate change (BGI can use excess water as a resource for communities and natural habitats. BGI also helps cool cities during extreme heat events), reduced sewer infrastructure cost (BGI reduces the volume of water entering the sewer system by returning water to the natural water cycle. This increases the lifespan of the sewers and reduces infrastructure maintenance costs), and increased green space for communities and wildlife (BGI provides multiple mental and physical health benefits to communities as well as provides a sanctuary for urban wildlife and pollinators).

Turning stormwater into a resource

The City of Santa Monica, in partnership with the Santa Monica Malibu Unified School District and the Metropolitan Water District of Southern California, has constructed the Los Amigos Park Storm Water Harvesting and Direct Use Demonstration Project. The project involves capturing stormwater runoff from a storm drain near the park, pre-treating flows with a hydrodynamic separator, storing flows in a subsurface storage system, and treating the water with ultraviolet light before use for indoor flushing and park irrigation, both of which currently use potable water. The project stores around 53,000 gallons of urban runoff and offsets up to 550,000 gallons of potable water per year, ensuring urban runoff can become a resource rather than a waste that carries pollution into Santa Monica Bay. In addition to reducing the amount of polluted

runoff going into the ocean, the project demonstrates to the wider community the benefits of capturing and using urban runoff and stormwater for uses that do not require potable water. Overall, the project contributes towards the city's wider goal of reducing water use by 20% and being 100% water self-sufficient by 2020.

Case: Incentivising BGI on private property in New York City

New York City's BGI aims to reduce combined sewer overflows into New York Harbour, in addition to providing multiple benefits including urban heat island reduction, and more habitat for birds and pollinators. To incentivize BGI retrofits on private property, the city's Department of Environmental Protection (DEP) is releasing a Request for Proposals to procure a Program Administrator to launch and administer a new BGI Private Incentive Retrofit Program. The five-year contract will have a value of $43-$58 million with a goal of retrofitting 200 greened acres. DEP has also released a streamlined fast-track review process for private green roof projects funded through its Green Infrastructure Grant Program. The funding schedule sets reimbursement rates for green roof projects based on growing media depth and planted area. These upfront reimbursement rates eliminate uncertainty over how much funding is available for potential projects and by giving this information to applicants in advance it means DEP can fast-track green roof grant applications, with anticipated design approval within 90 days from the submittal date.

Case: A green Lego city in Melbourne

To raise awareness of the issues of stormwater quality and surface runoff, Melbourne Water has developed the Water Smart City Model. This model is an educational activity suitable for all ages which can be used at community events and festivals. The activity involves the audience building a model city with roads and buildings made from Lego building blocks. Food dye, representing pollutants, is placed on the city and rainfall is simulated over the model, carrying the pollution over the impervious surfaces and into the 'bay'. A variety of features including rain gardens, rainwater tanks, swales and rooftop gardens are then added. Pollution is again added to the model and rain simulated. The amount of surface runoff is significantly decreased due to the retention capabilities of the new features, reducing risks of flooding. Pollution is also captured in the features so the water flowing into the 'bay' is cleaner.

Meaningful educational and job opportunities

BGI initiatives also provide meaningful educational, employment, and community-building opportunities, including:

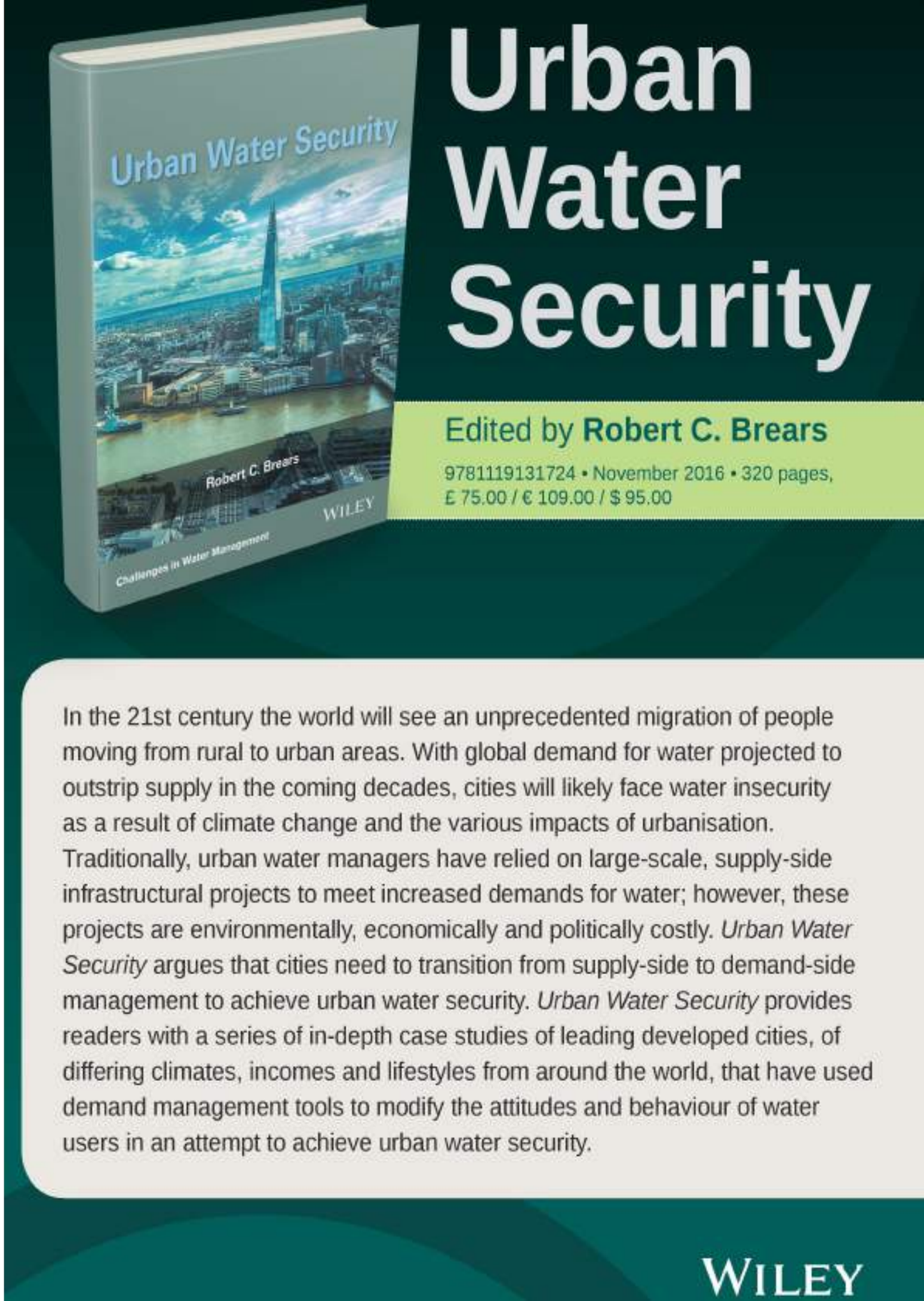
- *Tools to educate young children*: With climate change making heavy downpours and the risk of flooding more likely, Anglian Water in the UK is looking at BGI solutions to not only reduce and slow down the rainfall entering the sewers but to also use them as tools to educate young children on the environment and water cycle. For example, a BGI project at a primary school has a rain garden as well as a weather station to help the children monitor the climate at school.
- *Creates opportunities for minority and women-owned businesses*: Philadelphia has embarked on a BGI program that protects local communities from excess stormwater runoff while providing new green job opportunities. A key part of the BGI upgrade of the city is that small, local firms are encouraged to bid on and build BGI. This creates more opportunities for minority and women-owned businesses to be involved. The city is also working with non-profit organizations to train at-risk youth for BGI maintenance jobs.

Case: Scottish youth changing their local environment for the better

Greenspace Scotland is supporting youth groups to engage with others in their communities to take action to improve the environmental quality, biodiversity, playability, and vibrancy of neighbourhoods. Seed grants are available to support Young Placechangers (between the ages of 12–25) who want to change their local environment for the better. The scale of projects eligible for funding can range from local greenspaces and community gardens right up to neighbourhood-level initiatives such as implementing BGI to improve local waterways.

Conclusion

Blue-Green Infrastructure contributes to the development of climate, resilient, educated, and engaged communities.



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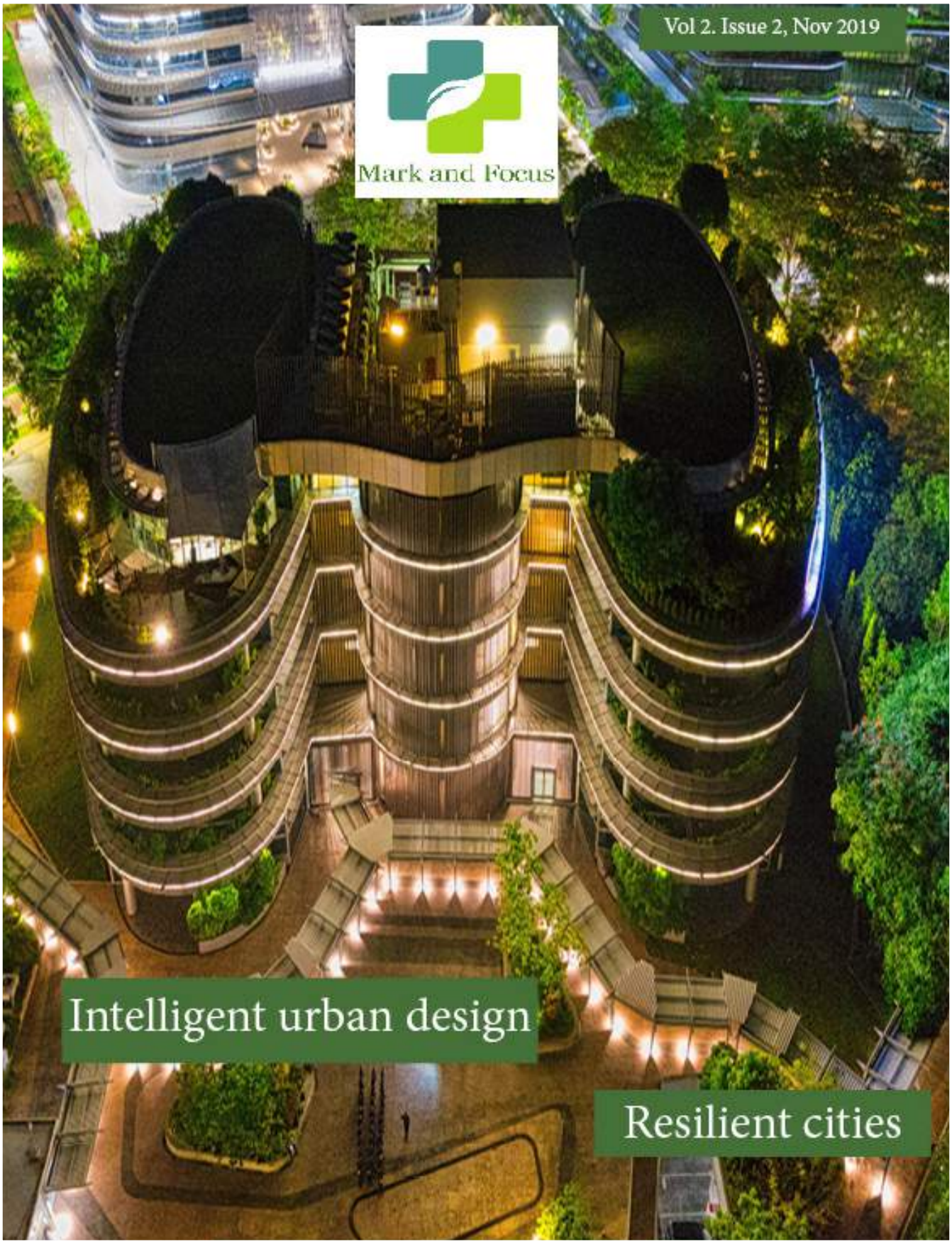
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