

## NEWSLETTER

### January 2021

#### Contents:

About the Joint IWA/IWHA SG on WAC

Message from the Group Chair

Upcoming Events

*6th IWA International Symposium:  
Water and Wastewater  
Technologies in Ancient  
Civilizations: Traditions, Culture  
and Religions*

*Workshop & Online Webinar:  
Water, Wastewater and  
Environment: Technology,  
Traditions and Culture*

Baptisteries in (Early) Christian Churches

The Yangtze River Water Culture:  
The Historical Crystal and Current Energy

Members of the Management  
Committee of the Joint IWA/IWHA  
SG on WAC

Papers Recommended by the Joint  
IWA/IWHA SG on WAC

News from IWA HQ

News from IWA Publishing

*Selected Books*

*Selected Journal Papers*

*Further IWAP Materials  
Recommended by the Joint  
IWA/IWHA SG on WAC*

*IWA Publishing Information*

IWA Learn

Become a Member of the Joint  
IWA/IWHA SG on WAC

Contribute to the Joint IWA/IWHA  
SG on WAC

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**Contributions from  
anyone are welcome!**

### ABOUT THE JOINT IWA/IWHA SG ON WAC

The Joint IWA/IWHA Specialist Group (SG) on Water in Ancient Civilizations (WAC) is dedicated to reveal technological heritage in ancient civilizations worldwide in order to: (a) assist to make visible the remaining of hydro-technologies, (b) describe and evaluate them, (c) develop new sustainable water and wastewater systems based on old principles and today knowledge and infrastructure, and (d) create monuments of inspiration for the water future. The most of ancient hydro-technologies were decentralized, cost-effective, friendly to the environment, and highly sustainable.

The ancient wisdom must be put into practice by creating awareness, undertaking policy research and lobbying to bring about change in policy as required so that water and wastewater management practices would further improve. It is time to think about managing the complete water cycle, to do so with impunity we look towards: *probing the past, forging the future.*



## MESSAGE FROM THE GROUP CHAIR

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Dear Colleagues and Members,

As I have said before, this time is truly unusual and challenging for all of us around the globe. In addition, this coronavirus crisis has no precedent in contemporary times is impacting daily lives everywhere and is causing a lot of uncertainties. We are all trying to understand what the long-term consequences might be for all of us.

In the long history of humankind, numerous accidental and/or deliberate water infections, which have caused pandemics, have been reported. Fortunately, the COVID-19 virus has so far not been detected in drinking water sources, water transmission has not been fully confirmed and to date, no data are available on the survival of the COVID-19 virus in water or wastewater. However, it is probably a good opportunity to prepare ourselves for the worst and to read water history and especially that related to water pandemics and in general to water conflicts globally through the centuries, with emphasis what and how we could learn from the past.

Before being part of IWA, the International SG on Water and Wastewater in Ancient Civilizations (WWAC) had more than 10 International Symposia, Regional Symposia and related workshops in various parts of the world, since 2006. The IWA SG was then organized and the 1<sup>st</sup> IWA International Symposium was organized in Crete, Greece. Despite the overall crises, we organized a rather small but very pleasant, successful and productive 5th IWA International Symposium on WWAC: "*Evolution of Technologies from Prehistory to Modern Times*" in Dead Sea, Jordan, on 11-13 September 2019. Many thanks are due to the organizers and especially to Prof. Khaldoun Shatanawi, Chair of the Organizing Committee.

Thereafter, we are in the direction of organizing the 6<sup>th</sup> IWA International Symposium, on ***Water, Wastewater, and Environment Technologies in Ancient Civilizations: Traditions and Culture***, which will be planned at the Bogazici University and in the Conference Hall of the Theological School of Halki in the island of Heybeliada, Istanbul, Turkey, for first time. We had proposed dates in September 2020 and then September 2021. Unfortunately, after several events following the vaccination against the COVID-19 virus, the organising committee is considering that it should be postponed again. Thus, we are discussing the possibility to be organized there in the first half of 2022 (to be confirmed later). We strongly believe that you will enjoy that Symposium and that your participation will highly contribute to your professional enhancement. We are looking forward seeing you all in Istanbul next April. Please find more information in this newsletter.

The Joint IWA/IWHA SG on Water in Ancient Civilizations (WAC), following a long discussion among the two Groups since 2019, is a reality. We are on the way of working together with IWHA for increasing and improving our activities. Also, we are working together with IWA Future Cities Program and other related organizations. A relevant workshop and webinar, ***Water, Wastewater and Environment: Technology, Traditions and Culture***, is being planned for 22 March 2021, in Patras, Greece.

Finally, it is worth noticing to point out that the publications of our Members on water history themes in International Journals and especially in Water Sci. & Tech. (WST), Water Supply, Water Policy, and others have been highly increased in the past year.

For now, I would like to wish you, your families, your colleagues, and your communities all the best in the time to come.

**Dr. A. N. Angelakis**

*Chair of Joint IWA/IWHA SG on WAC*

## UPCOMING EVENTS

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### 6th IWA International Symposium: Water and Wastewater Technologies in Ancient Civilizations: Traditions, Culture and Religions (Bogazici University, Turkey)

It is our great pleasure to announce the relaunching of the *6th IWA International Symposium, on Water, Wastewater, and Environment in Ancient Civilizations: Traditions and Cultures*, which will be held at Bogazici University and in the Conference Hall of the Theological School of Halki on the island of Heybeliada, Istanbul, Turkey. It will be organized in the **first half of 2022 (dates to be announced)**.

The Symposium is co-organized by the Bogazici University, Istanbul, Turkey and the Hellenic Open University, Patra, Greece; and is dedicated to topics relevant to the water traditions, cultures and religions. Information about ancient and traditional methods, practices and techniques of water resources management and sanitation in various civilizations throughout the millennia, focusing on the cultural and socio-economic role of water in the contemporary and ancient times and relation of water to life and death will be presented and discussed.

This unique event will bring together historians, archaeologists, and engineers from academic and research institutions, consulting firms and industries from around the world. It aims to promote interactions, to motivate discussions and to encourage collaborations among the global community on water resources in the past, present and future. In addition, valuable insights into traditional technologies with their apparent characteristics of durability, adaptability to the environment and sustainability focusing on those on culture and religions will be provided. These technologies are the underpinning of modern and future achievements in water, waste- and storm-water management practices.

Proposed themes of the Symposium are:

- i. Ancient and traditional methods, practices, and techniques of water and wastewater resources management in ancient civilizations
- ii. Urban water and wastewater reuse in ancient civilizations
- iii. Relation of water and climatic changes and/or variability
- iv. Ancient influences on modern water and wastewater technologies
- v. The cultural and socio-economic role of water and wastewater in ancient civilizations
- vi. The role of water in religion in contemporary and ancient times
- vii. The theological implications of the water
- viii. The relation of water to life and death
- ix. Water and health.

The Symposium will be Co-organized by the Bogazici University, Istanbul, Turkey and the Hellenic Open University, Patra, Greece. It will take place at the Bogazici University for two days and in the Conference Hall of the Theological School of Halki in the island of Heybeliada, Istanbul, Turkey for one day. On the last day

of the Symposium, a workshop relevant to water and ancient cultures will be held in the Theological School of Halki on the beautiful island of Heybeliada in the [Sea of Marmara](#), Istanbul.

We strongly believe that you will enjoy the Symposium and that your participation will contribute to your professional enhancement. We are looking forward seeing you all in Istanbul next year.

For more information, please see the Future Events section below. Please also visit <https://wwetc2021.env.eap.gr/> for more information. Please note the final dates of the symposium have not yet been set.

More information can be obtained from the Chairs of the Organising Committee of the Symposium:

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## Workshop & Online Webinar: Water, Wastewater and Environment: Technology, Traditions and Culture (Open University, Patras, Greece)

I inform you that a workshop will be organized on **22 March 2021** in Patras, Greece, which is also the date of celebration of International Water World Day. Also, I inform you that for all those who will not be able to participate personally, they can attend the workshop via **online webinar**.

The key theme of this workshop will be to look for effective ways of cooperation with other Specialist Groups dealing with the Evolution of Water Culture and History. We will look for joint actions and perspectives of existing Associations, Groups and other organizations including the Water Museums, dealing with water matters, from antiquity to the present day and what and how we learnt from the past.

The workshop will examine potential synergies that could be developed among the members of various relevant water organizations globally. Our intention is to invite representatives of the most water related International organizations. The workshop will be attended by representatives of the Greek Ministry of Culture, the Ministry of Environment, the Region of Western Greece, and the Municipality of Patras. The main topics of the meeting will be: (a) the possibilities for joint actions by various water history organizations towards the further study of the contribution of the ancient civilizations on the water technology and their impact on the contemporary water technology and effective management; and (b) the examination of the development of potential synergies among the members of various relevant water organizations globally, enhancing the cooperation among them, to the benefit of the world.

In the first two parts of the conference there will be interesting presentations that will refer to the ancient technologies of water and wastewater such as: Patras' Aqueducts in Ancient and Late Medieval Times, Water Management in Ancient Alexandria, Egypt, Holy Mountain (Agion Oros), and Stone Arch aqueducts. Additionally, technologies from the modern of treatment and management of waste from countries as case studies from Israel, Jordan Morocco and China will be presented.

The rough programme is as follows:

### 1. Committees

- (a) Organizing Committee (*Angelakis, A. N.; Salgot, M.; Margeta, J.; Pietz, D.*)
- (b) Scientific Members of the MC of the Joint IWA/IWHA SG on WAC

### 2. Themes

- (a) IWA and SGs
- (b) Joint IWA/IWHA SG on Water in Ancient Civilizations (*Angelakis, A. N.*)
- (c) Hydro-technologies in Minoan civilization (*Angelakis, A. N.*)
- (d) Archaeological Museums with Emphasis on Water Technologies (*Margeta, J.*)
- (e) IWHA History (*Pietz, D.*)

### 3. Conclusions (*Salgot, M.*)

The meeting will be held from 14.50 to 16.30 EET (13.50-15.30 CET), with some conclusions discussed from 16.45 to 17.15 EET (15.45-16.15 CET), on 22 March 2021.

There will be no registration fee to participate in this workshop, and all members of the Joint IWA/IWHA SG on WAC are invited to participate. Details of how to join the webinar online will be released later.

We are looking forward to welcoming you in Patras, Greece in a historical and pleasant place for synergism among expert of several groups around the world.

For more information, please contact:

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## Introduction

The implementation of water in religious issues was quite common in various cults before Christianity. Either being used as a rite element or through the use of water for healing purposes, related to the presence of divine forces. Baptism is also supposed to be related to very important various acts of cleansing in Judaism and other cults. The ritual of admission and adoption into Christianity is called Baptism -from the Greek noun βάπτισμα *baptisma-vaptisma-* and almost invariably with the use of water.

Baptistry was a structure or building complex annexed to the early Christian basilicas. Basilicas were maybe the most popular and archetypal church of the Christian art, since it was widely – if not exclusively – used during the early Christian period. In this architectural type the emphasis is on the length and therefore it is often characterized as basilican plan. Besides, one architectural origin of the basilica (since there are many disputes on its origin) are the Roman roads that had arcades supported by columns on their sides. According to another view, it derives from Roman halls of throne in the peristyle of the Roman houses or in the funerary chapels of the catacombs and the cemetery martyria. Baptisteries usually were consisted – apart from the yard or the external area of the baptism in contact with the southern aisle (in most cases) of the basilica - of two more rooms annexed to the afore-mentioned yard.

**Baptism as an ecclesiastical mystery.** The historical importance of baptism to Christians is related to the Baptism of Jesus himself at the Jordan River by St. John the Baptist, who used baptism as the central sacrament of his messianic movement. On the other hand, the Baptism in the name of Jesus, distinguished from that of the baptism of John according to Apostle Paul, it is also questionable by some scholars whether was in some way linked with that of John (Schmithals, 1997). Water baptism is being considered as an act of faith and obedience to the commands of Christ, like a public confession of the baptized faith in, and commitment to, Jesus Christ. Therefore, accordingly it could be evaluated the significance of the baptisteries, especially at the early ages of Christianity, when there still was quite high pagan population percentage.

## Baptisteries

The building arrangement of the baptistry was in total accordance with the ritual order during the baptism. Thus, the baptized to be from the yard or the exterior house, where the blessing, the exorcism and the profession of faith took place went into the interior, the photisterion. There he would get undressed, get anointed with the sacred oil and recite the Symbol of the Faith in front of the bishop. Finally, the baptism in the font would take place with the symbolism of diving and ascension. Therefore, there was a built font in the

centre of the photisterion. The newly baptized dressed in white received the chrism by the bishop in the chrismarion, the room next to the photisterion where from the baptized entered the church in order to attend the mass in front of the Holy Bema for the first time.

The typology of the baptisteries varies from simple three-aisle annexes at the NW or SE side of a basilica, to typical square or octagon rooms, with or without niches, standing in some cases as independent buildings, connected or not to the main church. Sometimes the three-aisle examples resembled as a typical basilica (i.e., in Katapoliani on Paros, Greece). There the *photesterion* (space where the baptized was instructed to the beliefs of Christianity) was either one of the aisles or the narthex.

Positioning of the Baptistery. Either next to the north or south aisle, baptistery was near the narthex of the basilica, that means to the entrance, a tradition surviving somehow in later churches where Aspersion and affusion fonts are placed often near the west end. It was not a rare case the introduction of the baptismal ritual in pre-existing cult spaces as the case of the main Roman temple of Jupiter in Diocletian palace at Split, signifying the dominance of Christianity over the old pagan faith.

The Baptismal Font. At the early times baptism was practiced generally with full, or almost immersion into water, and that characterized the formation of the fonts. Even though the cross shaped font with steps at the edges was the most popular, circular, hexagon and square fonts with or without steps were also built. Actually, they were not very deep and the immersion should have been partial.

Water Supply matters. Even though some scholars (Βολανάκης 1976) relate the size and depth of the font in some areas (as the Aegean islands) to the water scarcity, there are no traces for water supply system to the fonts. Probably they were filled with buckets of large clay jars. A distinct case of a font with traces of drain grooves in Tunisia should be considered as an exception.

Decay of Baptisteries importance. Even though there is a late middle ages period when the importance of baptisteries is reflected by very elaborate independent buildings (i.e., in Pisa, or Florence Italy) the establishment and expansion of infant baptism diminished the needs of adult Baptism, or of baptism of new believers and therefore of the separate building of space for the baptism. When the needs for adult baptism were almost eliminated baptisteries were transformed to churches or chapels, or were introduced in a relative use. When some needs for adult baptism arose, at the end of the 20th century, new baptisteries were built rather than old ones were reused for their original function.

## Conclusions

The implementation of water in religious issues was quite common in various cults before Christianity. The ritual of admission and adoption into Christianity is called Baptism -from the Greek noun βάπτισμα *baptisma-vaptisma-* and almost invariably with the use of water. The historical importance of baptism to Christians is related to the Baptism of Jesus himself at the Jordan River by St. John the Baptist, who used baptism as the central sacrament of his messianic movement. Baptistery was a structure or building complex annexed to the early Christian basilicas. The building arrangement of the baptistery was in total accordance with the ritual order during the baptism. Variety in shapes and positioning can be found at the building of the baptistery. Usually was annexed to one of the side aisles of the Basilica church. The baptismal font was its main and focal point. Besides the cross shaped font with a probable symbolism, there were also other forms of the fonts in the baptisteries.



The importance and significance of baptisteries at the beginning of the Christianity has been presented at the size, elaborate structures and spreading of the type, in every land the new religion was established. It was not only the ritual importance of the baptism but also the social significance because of the public character of that rite. The presence of a baptistery, simple or elaborate in every basilica or ordinary church of that period signifies that importance, which is also strengthened by several elaborate features of the baptisteries and their fonts, with marble coatings and mosaics with relevant illustrations. Even when the infant baptism was established, baptisteries retain their significance and their later use shows that surviving original importance.

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# THE YANGTZE RIVER WATER CULTURE: THE HISTORICAL CRYSTAL AND CURRENT ENERGY

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## **Xiao Yun. Zheng**

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Member of MC of Joint IWA/IWHA SG on WAC

The Yangtze River is the longest river in China and the third longest river in the world, next only to the Amazon River in South America and the Nile River in Africa. The length of the Yangtze River is 6,397 km, with a basin of 1.8 million km<sup>2</sup>. The Yangtze River has a huge amount of water, with an annual runoff of more than 970 billion m<sup>3</sup>, or nearly 1 trillion m<sup>3</sup>, nearly 17 times that of the Yellow River (which has a mere 580 m<sup>3</sup>, is second longest river in China). The Yangtze River has nurtured the southern land of China. Since the Song Dynasty (960-1279 AD), it has developed economically and prospered culturally. Therefore, it was called the "mother river" of the Chinese nation together with the Yellow River.

The Yangtze River is not just a big river, it was also the driver of Chinese civilization. It driven the development of agricultural and urban civilizations historically, made the basin to be the most important agricultural areas and driven the establishment of a series of influential cities along the river, like Wuhan, Chongqing, Nanjing, Shanghai, and others and many other big cities in its tributaries. It also constructed the local societies, lifestyles and cultures which were resulted of water understanding, use, management and living along with the river. Consequently, it also formed rich water-related culture, the Yangtze River Water Culture.

It is different to defining the term of the Yangtze River Water Culture, but it could be considered as the cultures which are generated driven by water management and living with the river. It is characterized with the river what are rich in water resources, water forms like tributaries, lakes in its nature, and rice cultivating based agriculture, mass fishing in lake, water transportation and river cities, canal-based water networks, stable settlement and life, etc. obvious characteristics which are compared with the Yellow River.

The Yangtze River water culture should be included in aspects as below:

- (a) The rice paddy agriculturally based water management. The Yangtze River basin, especially the mid and downstream basins are with rich water resource and diversified water form, brings advantageous conditions for rice paddy agriculture. Therefore, the basin was developed as the main paddy agricultural areas of China from its early history. It is suggested that Yangtze River mid-downstream was the original place of rice cultivation that was dated back to 10,000 years, it is also formed the foundation of Yangtze River Civilization (Yoshinori Yasuda, 2013). Water management was matched with this character to made dam and canal for irrigation. Consequently, mass dams and canals were constructed from ancient times in the basin, especially in the river's tributaries and affiliated lakes. Water resources management also driven formation of local social relations, lifestyles, faiths, etc. A typical case is the Du Jiang Yan Dam in Chengdu city, an ancient dam constructed in 251 BC to introduce a tributary of Yangtze River into the Chengdu flatland for irrigation by canals. It is functioning until today. The ancient water management also remained mass historical cultural heritage to today, included tangible and intangible heritages, consisted as important part of Yangtze River water culture.

- (b) The urban water management. As mentioned above, there are many influential cities established along Yangtze River and its tributaries, affiliated large lakes in the ancient times. The river brings convenient water transportation and natural defining conditions to drive the city's construction to be the political and economic centres. For example, Nanjing city from a small city becomes a series of local states and the national capital city historically was because its location where at the riverbank. Depended on this situation, a remarkable achievement of water management was that there were many large-scale canals were constructed to connect other rivers and lakes, formed a series of large water networks depended on Yangtze River. For an example, the Qin Huai He river of Nanjing City, is a small river in length of 130 Km, but it became one of most influential and famous rivers in China due to the canals construction to connected Nanjing City and other water systems that was formed a large and strategic water transportation network (Xiao Yun. Zheng, 2018.) These achievements are effectively driven the urban development in Yangtze River basin. The river driven cities and large-scale water transportation have generated mass water related urban cultures as well. Anyway, all the cities along the river are characterized with the river culturally that is different with other cities in China (Xiao Yun. Zheng, 2015).
- (c) The social culture which was formed by the river. The agricultural and urban development which depended on the river nature and water management also driven the construction of the basin social and cultural features. Locally, the identity, psychological states, lifestyle, arts, faith, food, etc. are usually characterized with the river historically. For example, the unique rice culture and garden culture along the river, etc. Regionally, the regional civilizations were formed in the sections of the river basin depended on geographical features of the basin. For example, the Ba-Shu civilization, Jing-chu civilization, etc. these civilizations are characterized with the regional feature of the Yangtze River basin. (Li Xue Qing, 2011)

Geographically, Yangtze River is a big river with the sectional features. Geographical features of the basin formed the cultural features of the sections. Accordingly, traditional understanding and research of the Yangtze River culture are usually focused on the regional culture but lack of the general understanding, especially the culture of upstream was often neglected. Currently it is valuable and necessary to explore Yangtze River water culture in a holistic horizon, to understand how the river driven the national civilizational development under the current national strategy of Yangtze River Holistic Protection and Yangtze River Economic Belt Construction.

What is valuable to exploring the water culture of Yangtze River is that it will benefit us to understand how the river driven the basin civilizations' s origination and development historically and increase the understanding the water sustainability of the river, and then take good care to the river. The basin civilizations were constructed driven by the river, consequently we can continue maintaining the civilizations and reconstructing new culture following the river's life.

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## MEMBERS OF THE MANAGEMENT COMMITTEE OF THE JOINT IWA/IWHA SG ON WAC

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The members of the Management Committee of the Joint IWA/IWHA Specialist Group on Water in Ancient Civilizations (WAC) are as follows:

1. Andreas Angelakis, *Chair*
2. David Pietz, *Vice-Chair*
3. Najet Aroua, *Working Group leader and Publications*
4. Walter Dragoni, *Secretary or Treasurer*
5. Angie Jin Zhang, *Young Water Professional Representative*
6. Petri Juuti, *Public Relations and External Relations Coordinator*
7. Ioannis Kalavrouziotis, *Events Coordinator*
8. Jure Margeta, *Treasurer / Newsletter Editor*
9. Larry Mays, *Webmaster for IWA Connect and Website*
10. Miquel Salgot de Marçay, *Secretary or Newsletter Editor*
11. Johann Tempelhoff, *External Relations Coordinator*
12. Zheng Xiao Yun, *Membership Coordinator*

## PAPERS RECOMMENDED BY THE JOINT IWA/IWHA SG ON WAC

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## NEWS FROM IWA HQ

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### [IWAP flips all journals to Open Access](#)

IWA Publishing has successfully transformed its journal portfolio of 10 subscription titles—including the flagship journal *Water Science & Technology*—to Open Access (OA) from 2021 onwards. In partnership with Knowledge Unlatched (KU), IWA Publishing has asked libraries and institutions currently subscribing to any of the journals to renew for 2021 on a Subscribe-to-Open (S2O) basis, thus contributing to making the journals free to readers and researchers worldwide.

### [IWA Digital World Water Congress 2021](#)

IWA will be holding a major virtual event – the Digital World Water Congress – from 24 May to 4 June this year. The Congress will include a range of presentations, networking opportunities, poster sessions and much more. To register your interest in attending, and more updates in the following weeks, please visit the IWA website.

### [IWAP announces relaunch of two journals](#)

In January 2021 the IWA Publishing team relaunched two of its titles, with new branding, aims, scopes, and editorial teams. The *Journal of Water Reuse and Desalination* becomes *Water Reuse*. The new editorial team is headed up by Prof. Stephen Gray (Victoria University, Australia) and Prof. Hong-Ying Hu (Tsinghua University, China).

### [Nature-based Solutions Report](#)

The Nature Conservancy has published a new report on the benefits of nature-based solutions for clean water for European cities. The report is entitled: 'Resilient European Cities: Nature-based solutions for clean water'. IWA is a strong advocate for the use of nature-based solutions to improve the quality and security of water and sanitation services.

### [Influential scientist wins IWA Young Leadership Award](#)

Renowned scientist and engineer Dr. Siddhartha Roy has won the IWA Young Leadership Award (2020/22). Dr. Roy will now also begin a two-year term as an industry ambassador for the IWA and the water sector in general. Currently, Dr. Roy works as an environmental engineer and postdoctoral research scientist at Virginia Tech, USA.

### [World Water Congress moves to 2022](#)

IWA's upcoming World Water Congress & Exhibition in Copenhagen, Denmark, has been moved forward to September 2022. The decision to postpone was taken due to the ongoing pandemic, and general uncertainty around live events and international travel. All existing tickets will remain valid, and IWA also plans to hold a virtual congress in Q2 of 2021.

### [Digital Water: The role of Instrumentation in Digital Transformation](#)

The concept of the Digital Transformation, especially in the Water Industry, includes a broad range of techniques and methods that can be used to allow the industry to operate with more efficiency and to make decisions based upon a more informed way of working. The aim of this white paper is to highlight the crucial role of the right instrumentation.

### [Young Water Leaders on Technological Innovation in Water](#)

The IWA Emerging Water Leaders Steering Committee held an online discussion with the IWA Young Water Professionals on 11 November 2020. This gave attendees an opportunity to meet peers and exchange ideas on topics relevant to their work as water professionals, as well as on the future of the water sector, and much more.

### [Sustainable Development Goals – Slide Deck](#)

The IWA Sustainable Development Goals Taskforce was formed in 2017 to identify a valuable role for IWA to play in attaining the SDGs. This research recognised three roles: Supporting members' SDG knowledge development; strengthening members' connection with the 2030 agenda; and member guidance to establish SDG-driven agendas.

### [IWA Podcast: Meet the finalists of the 2020 IWA Young Leadership Award](#)

The IWA Young Leadership Award is granted every two years to an exceptional water professional age 35 or younger who has demonstrated significant achievements in his/her career and contributes to the IWA community. The awardee has demonstrated outstanding leadership and has taken an influential role in the water industry.

### [World Toilet Day: CWIS Through Regulation](#)

This article is part of a series for World Toilet Day highlighting issues within the WHO-UNICEF State of the World's Sanitation report. The need for sustainable, equitable and inclusive sanitation solutions in urban areas across the globe is greater than ever before, particularly in the wake of the global COVID-19 crisis, rapid urbanisation and climate change.

### [Landmark report marks World Toilet Day](#)

To mark World Toilet Day (19 November 2020), a new report on how technology can be used to improve sanitation and public health outcomes has been launched by the International Water Association (IWA) and the Toilet Board Coalition (TBC). The white paper is entitled 'Improving Public Health Through Smart Sanitation and Digital Water'.

## Selected Books

### International Rainwater Catchment Systems Experiences: Towards Water Security

*José Arturo Gleason Espíndola; César Augusto Casiano Flores; Raul Pacheco-Vega; Margarita Rosa Pacheco Montes*

ISBN: 9781789060584

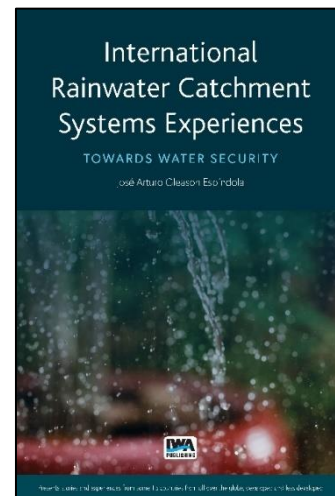
May 2020 • 270 pages • Paperback

 **Open Access eBook: Available for FREE download!**

IWA Members print price: £64.00/ \$96.00/ €80.00

<https://www.iwapublishing.com/books/9781789060577/international-rainwater-catchment-systems-experiences-towards-water-security>

This book was written for all people interested in sustainable rainwater management. Students, people just starting in the subject, and experts will find this book interesting as it creates an overview of rainwater harvesting practice and technology all around the world.



### Wastewater and Biosolids Management

*Ioannis K Kalavrouziotis*

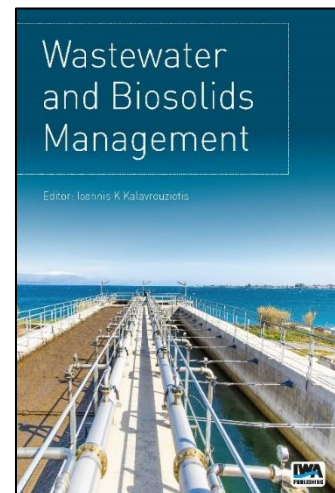
ISBN: 9781780408224

June 2017 • 138 pages • Hardback

IWA Members print price: £85.00/ \$128.00/ €106.00

<https://www.iwapublishing.com/books/9781780408224/wastewater-and-biosolids-management>

Wastewater and Biosolids Management aims to present existing modern information about wastewater reuse management based on earlier literature on the one hand and recent research developments, many of which have not so far been implemented into actual practice on the other. It combines the practical and theoretical knowledge about 'wastewater and biosolids management' and in this sense it is useful for researchers, students, academics as well as for professionals.



### Water Stewardship

*Pernille Ingildsen*

ISBN: 9781789060324

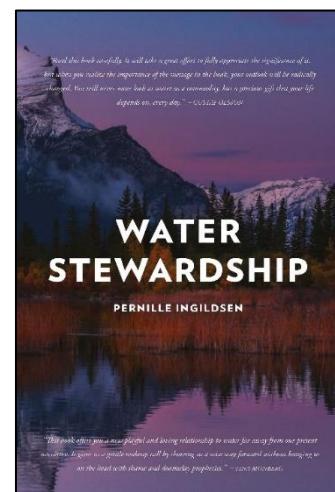
June 2020 • 200 pages • eBook

 **Open Access eBook: Available for FREE download!**

IWA Members print price: £45.00/\$68.00/ €56.00

<https://www.iwapublishing.com/books/9781789060324/water-stewardship>

This book asks the timely question of 'how do we become true water stewards?' The transformation to a new sustainable practice will be made through a new connection with our heart, a more holistic type of analysis (brains) and the right actions based on personal integrity (hand). These ideals are then linked to how we can take responsibility for human water consumption and our interaction with the natural world.



## Selected Journal Papers

**Hydrological principle behind the development of series of bunds in ancient tank cascades in small catchments, Sri Lanka**

 **Open Access Article: Available for FREE download!**

K. T. N. Perera; T. M. N. Wijayarathna; H. M. Jayatilake; J. M. A. Manatunge; Tilak Priyadarshana  
*Water Practice and Technology* (2020) 15 (4): 1174–1189  
<https://doi.org/10.2166/wpt.2020.088>

**Implications of storage state behaviour of village tanks in adaptation to climate change, Sri Lanka**

 **Open Access Article: Available for FREE download!**

K. T. N. Perera; T. M. N. Wijayarathna; H. M. Jayatilake; Tilak Priyadarshana; J. M. A. Manatunge  
*Journal of Water and Climate Change*  
<https://doi.org/10.2166/wcc.2020.285>

**Historic hydraulic works: paradigms of traditional good water governance, integrity and sustainability**

 **Open Access Article: Available for FREE download!**

Feirouz Megdiche-Kharrat; Xiao Yun Zheng; Mohamed Moussa; Zhang Famin; Andreas N. Angelakis  
*Water Supply* (2020) 20 (7): 2484–2498  
<https://doi.org/10.2166/ws.2020.146>

**Evolution of urban waste- and storm-water management in the region of Crete, Greece: a preliminary assessment**

 **Open Access Article: Available for FREE download!**

A. N. Angelakis; P. Koulouri; C. Dounas; G. Tchobanoglous  
*Water Science & Technology* (2020) 81 (11): 2281–2290  
<https://doi.org/10.2166/wst.2020.305>

## Further IWAP Materials Recommended by the Joint IWA/IWHA SG on WAC

**Evolution of Water Supplies in the Hellenic World Focusing on the Water Treatment and Modern Parallels**

 **Open Access Article: Available for FREE download!**

A.N. Angelakis; K.S. Voudouris; G. Tchobanoglous  
*Water Supply* (2020) 20 (3): 773-786  
<https://doi.org/10.2166/ws.2020.032>

### Microplastics in Water and Wastewater

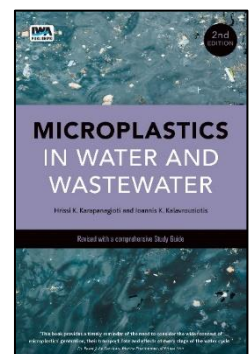
**Editors:** *Hrissi Karapanagioti; Ioannis K Kalavrouziotis*

ISBN: 9781789061680

October 2020 • 300 pages • Paperback

IWA Members price: £ 60.00 / US\$ 90.00 / € 75.00

<https://www.iwapublishing.com/books/9781789061680/microplastics-water-and-wastewater-2nd-edition>





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To learn more, visit the IWA Learn platform: <https://iwa-network.org/iwa-learn/>

**WEBINAR**  
**Scaling Digital Solutions in the Water Sector**  
10 February 2021 | 13:00 CET  
*Register now!*

**WEBINAR**  
**Empowering Women in Water**  
8 March 2021 | 15:00 CET  
*Register now!*

**SHORT-TERM COURSE**  
**Nature-based Solutions for Water and Land Management**  
*Register now!*

**ON-DEMAND WEBINAR**  
**Regulating Service Providers for Citywide Inclusive Sanitation**  
*Watch on-demand*

## BECOME A MEMBER OF THE JOINT IWA/IWHA SG ON WAC

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The Joint IWA/IWHA SG on WAC welcomes new members. To join, please follow the instructions below.

**For IWA members**, who already have Connect login details, please go to <https://iwa-connect.org/group/water-in-ancient-civilizations-joint-iwaiwha/timeline> and simply click on “Join Group” button on the top right.

**For new friends**, please register to join IWA by visiting <https://iwa-connect.org/subscribe> and then follow the link above to join the Joint IWA/IWHA SG on WAC group.

**Connect to the world's leading water professionals**

**Be part of our network today | [www.iwa-connect.org](http://www.iwa-connect.org)**



## CONTRIBUTE TO THE JOINT IWA/IWHA SG ON WAC

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The editors, on behalf of the Joint IWA/IWHA SG on WAC, encourage the members to collaborate in future editions of the newsletter with information on any relevant aspect of water history. It is important for the development of the Joint IWA/IWHA SG on WAC to enlarge the number of active members contributing to the tasks of the Group.

The contribution could be in form of short papers, notices on any event or news related to the SG activities. Our main objective should be to foster the ancient waters knowledge and the collaboration among the members.

In addition, the possibility to jointly prepare manuscripts in relevant themes (e. g. history of water mills, history of desalination, history of dams, history of wetlands and history of water conflicts) was discussed and members are invited to contribute.

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