

## Editorial: Wetland systems for water pollution control

### INTRODUCTION

Finally! Because of the pandemic, our IWA Specialist Group on Wetland Systems for Water Pollution Control was unable to meet for almost 4 years. In Valencia, during its 16th edition, the conference has shown very interesting trends and new scientific orientations through keynote speeches, oral presentations and posters including for integration of wetland systems in the urban environment, or the role of wetlands system to favour circular economy and the use of intensifications in wetland systems.

In Lyon 2022, the 17th edition, we were able to see that these orientations had become major research topics for several teams in our specialist group and recent advances have clearly established the role of wetland systems in the development of modern water management strategies. The added value compared with regular systems relies mostly on the co-benefits aspect as this was also clearly addressed (habitat for biodiversity enhancement, visual appealing, temperature control, etc.).

The specialist group is excited for the 18th edition, planned for 24–29 November 2024 in Fort-de-France, Martinique.

From the publication of the first widely diffused papers on constructed wetlands in the 1980s to the recent advent of nature-based solutions that systematically offer an alternative to treat a very large number of pollutants in water, our field has undergone a spectacular evolution. The use of treatment wetlands became much more than just a technical innovation; it is a way of rethinking our relationship with nature and recognising the solutions it can offers. By adopting more sustainable wastewater treatment methods, we are taking a significant step towards a future where human development and environmental preservation go hand in hand.

### THE 17TH INTERNATIONAL CONFERENCE ON WETLAND SYSTEMS FOR WATER POLLUTION CONTROL IN LYON-FRANCE

The International Conference on Wetland Systems for Water Pollution Control (ICWS), established in 1988, has become a reference forum for wetland systems science. Every two years, leading experts meet and present their research activities and experiences and discuss new concepts and new technologies. The 17th edition was held in Lyon, France in October 2022 under the leadership of INRAE REVERSAAL and INSA DEEP research units. The conference took place in the city centre of Lyon, capital city of gastronomy and good wetland research. Plenary, parallel, and poster sessions were held. At this edition, 6 keynote speakers were invited:

- Dr. Anacleto Rizzo, presenting work on ‘Wetland community expertise in the new nature-based solution and circular economy vision: links and new research and design trends’;
- Dr. Katharina Tondera, presenting her work on ‘Treatment wetlands for management of stormwater and combined sewer overflows in an urban context’;
- Msc. Katharine Cross, presenting her work on ‘Nature-based solutions for climate resilient water and sanitation services’;
- Dr. John Bavor, presenting his vision on ‘Where have we been and where are we going – a retrospect on wetland systems for water pollution control’;
- Prof. Srikanth Mutnuri, presenting his work on ‘Vertical flow constructed wetlands as decentralized wastewater treatment systems in Goa, India’;
- Prof. Dr. Yaqian Zhao, presenting his work on ‘Where do we stand to oversee constructed treatment wetland?’.

Altogether, the keynotes gave very inspiring talks and enabled the audience to have a broad vision of the wetland systems development all over the world with a focus on Asia and Oceania. The equilibrium of the presentations was highly relevant, with rich cross-section views on the application of wetland systems to control diffuse pollution and treat domestic wastewater and the co-benefits associated.

During the parallel sessions, more than 130 oral presentations and 42 posters have been presented and shared among about 234 participants (Figure 1) representing 43 countries.



**Figure 1** | Group photo from the 17th International Conference on Wetland Systems for Water Pollution Control in Lyon-France.

Three conference tours have been organised, one taking ICWS delegates around Lyon to visit different infrastructure for rainwater management, another focusing on domestic wastewater treatment by treatment wetlands and the other combining both domestic wastewater treatment and combined sewage overflow treatment by treatment wetlands.

Apart from enabling delegates to enjoy the great gastronomy of Lyon (especially its saucissons secs, cheeses, and wines), the 17th edition of ICWS enabled its delegates to share new ideas and the latest developments in the wetland system world with many contributions especially for the following topics:

- Wetlands for Water Pollution Control (20 oral presentations, 20 poster presentations);
- Water Reuse and Resource Recovery (20 oral presentations, 3 poster presentations);
- Emerging Contaminants (20 oral presentations, 8 poster presentations);
- Urban Wetlands (16 oral presentations, 5 oral presentations);
- Intensified Wetlands (16 oral presentations, 2 poster presentations);
- Process Understanding and Modelling (16 presentations, 2 poster presentations);
- Co-benefits and Multifunctionality (8 oral presentations, 4 poster presentations);
- Climate Change and Adaptation (4 oral presentations).

The most popular topic was related to wetlands for water pollution control as usual but new topics are rising and will most likely become major research fields in our community in the near future such as water and resource recovery and urban wetlands.

It is worth mentioning the contribution of Latin American researchers in these editions (half of the selected papers) and it is not a surprise that the next edition will be held in Martinique bridging together the Latin American community and the Pan American Network on Wetland Systems. A very important event where we hope to meet all the readers of these special issues.

### **THE CONFERENCE SPECIAL ISSUE IN BLUE GREEN SYSTEMS (BGS) AND WATER SCIENCE AND TECHNOLOGY (WST)**

These special issues consist of 14 selected papers from the 17th International Conference on Wetland Systems for Water Pollution Control in Lyon-France, 3 in BGS and 11 in WST.

The BGS selected papers included the conference topics: Treatment wetlands for water reuse and resource recovery, Treatment wetlands for climate change and adaptation, Treatment wetland co-benefits and multifunctionality, and Urban wetlands.

The WST selected papers included the conference topics: Wetlands for water pollution control, Treatment wetland process understanding and modelling, Treatment wetlands for removal of emerging contaminants, and Intensified treatment wetlands.

In BGS, topics are related to the role of CWS in relation to the biogeochemical cycles of the surrounding ecosystems and the contribution of wetlands systems in mitigating climate change.

The WST special issue contains several articles: industrial and domestic wastewater treatment, the development of new designs, and the understanding and optimisation of purification mechanisms.

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