Blue Papers 2024 (Vol. 3 No. 1), pp. 152–63
10.58981/bluepapers.2024.1.12
Received: 01 February 2024; Accepted: 15 April 2024; Published: 06 May 2024.

From Landmarks to Watermarks: Water Towers as Hidden Signs of Water through the Value Case of Ourinhos, Brazil

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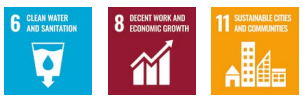
This contribution explores the case of Ourinhos, Brazil, through a value case approach. The findings are based on the author's work in the professional education course Water System Design: Learning from the Past for Resilient Water Futures, offered by the UNESCO Chair Water, Ports and Historic Cities team based at TU Delft. Following the methodology of the course, the author identified water towers as key elements of transformation and developed the concept of watermarks. Following a brief investigation of history, heritage and context, the article examines the potential of water towers to act as watermarks for educational and professional institutions present in the region. Drawing on pop culture among the city's young people, the article proposes making the Ourinhos Water Tower a recognizable watermark of the city, a place worth visiting and engaging with. The plan includes people from a variety of backgrounds, interests, ages and perceptions who can join forces to develop powerful solutions to water challenges.

Keywords: *water tower, heritage, SDGs, values, watermarks*



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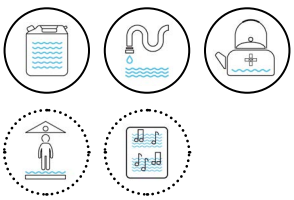


< Fig. 1 The Water Tower of Ourinhos (Source: Monica Clauzet Leite de Souza Manzione, 2023).

Introduction

We need new solutions to complex water problems related to climate change and population growth. Many practitioners and academics are looking to the past to learn from historic water spaces, practices and heritage (Hein 2022). This approach is also the foundation for the course Water Systems Design: Learning from the Past for Resilient Water Futures,[1] which provides a value based approach that catalyzes spatial and infrastructural transformations and includes values associated with material, economic and cultural flows (Robbins and Sommerschuh 2016/2023; D'Agostino and Hein 2024). Learners create a value case following a value based approach. This article demonstrates how learning in the course can help (re)connect water, culture and heritage and how it advocates for a change in narratives through the Ourinhos case study. The article applies key lessons of the course to an analysis of Ourinhos and offers a plan – the Watermarks project – to leverage existing water structures in order to raise water awareness and public engagement in water-related issues.

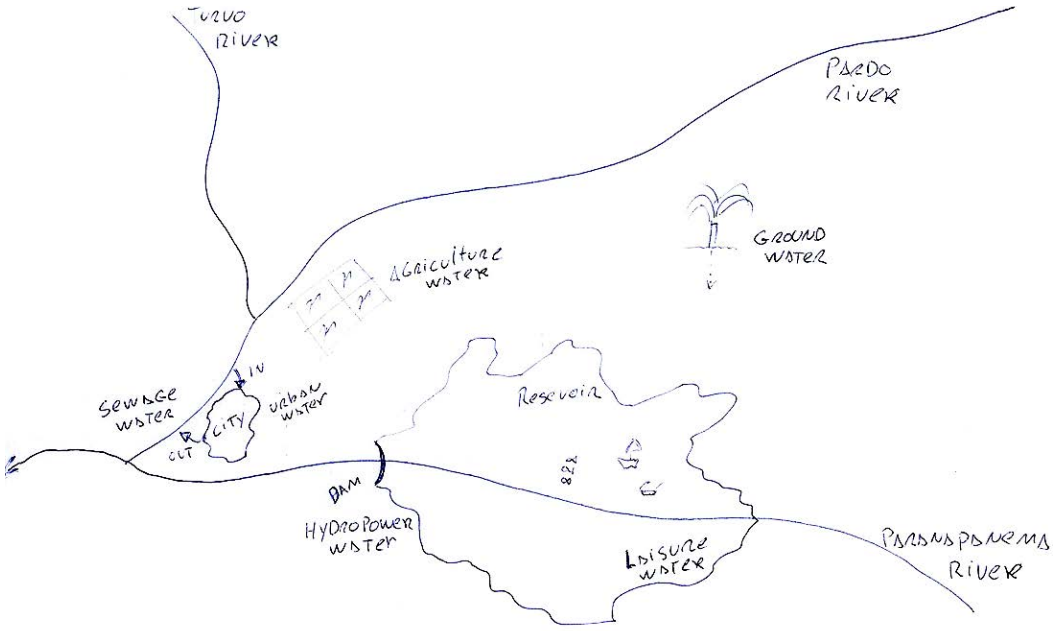
Watermarks and Water Values

In English, a watermark is a design on paper that aids identification or ensures authenticity. A watermark can also be a mark that indicates the height to which water has risen (usually as a result of flooding). In this article and in the project the term "watermark" denotes a landscape feature associated with water. Every city has watermarks, like wells, dams, fountains, cisterns, canals, towers and water tanks. There are also natural formations that permeate cities and their surroundings, such as rivers, lakes, aquifers, wetlands and glaciers. These watermarks have multiple functions related to water systems, communities and identity. They serve diverse groups and therefore embody multiple values, including those that are economic, political, social and cultural. Watermarks erected a long time ago continue to affect the built environment and can be considered heritage, even when not officially recognized as such (Hein 2023). Watermarks and their functions directly or indirectly impact the hydrological cycle of a region. It is thus important to consider the geographic space of the water system in which watermarks are embedded to promote restoration – and avoid further disruptions of – the water cycle. Understanding the values associated with watermarks, their formation through time and current impact on practices and space can inspire future practices, activate perceptions of – and relations with – water and heritage and enable context-sensitive water management projects able to preserve heritage while promoting sustainable water uses (Hein et al. 2023).

Rethinking the Water System of Ourinhos: Developing New Strategies

From the establishment of the city of Ourinhos (São Paulo State, Brazil) in 1906 to the present day, values involving the water supply system have been changing. At the city's founding, marked by railroads and coffee production (Dias 2014; Cunha 2020), values such as ambition, leadership, success and working with pride shaped the character of the population and its founders. The creation of the first water system can be considered an achievement – it provided water security to the population with a

1. "Water Systems Design: Learning from the Past for Resilient Water Futures," https://online-learning.tudelft.nl/courses/water-systems-design-learning-from-the-past-for-resilient-water-futures/.



^ Fig. 2 Location of Ourinhos, São Paulo (Brazil), its main rivers and water uses (Source: Rodrigo Lilla Manzione, 2024).

regular supply of quality water, for the common good. But with expansionist policies, the former rulers allowed the city to grow without proper regulation to protect water sources, even when expansions of the water system aimed to create social order and provide water for all. Disease and pollution arising from untreated sewage led to interventions that sought to address issues of health and water quality. However, the government did not maintain this leadership in water health for long. For decades a sewage treatment plan was on the table of the decision makers, without further developments. The population has not demanded change, revealing little awareness of how a region rich in water resources could experience water problems. The main reason is a lack of information and knowledge about water and related systems at all levels. How is it possible to reconnect people with water and its importance in a place where water has not been properly valued?

Place and Context

In terms of water sources, Ourinhos is a privileged city, with three large rivers in its domain, the Pardo-Turvo-Paranapanema Rivers (fig. 2). The region also has many uses for its water supply, including drinking water, sanitation, agriculture, hydropower generation, leisure and recreation. The varied uses come with an equally diverse list of stakeholders. The Pardo River is responsible for 90 per cent of the water used by the city of Ourinhos. As extraction has increased, the Pardo River has reached its limit of providing water to the population and receiving the city's sewage without treatment. To increase water supply, groundwater has been tapped and instead of solving the sanitation problem, the city government has discussed the possibility of privatizing water services and investing this money in other urban services, such as education, security or health.

Ecosystems, Flows and Networks

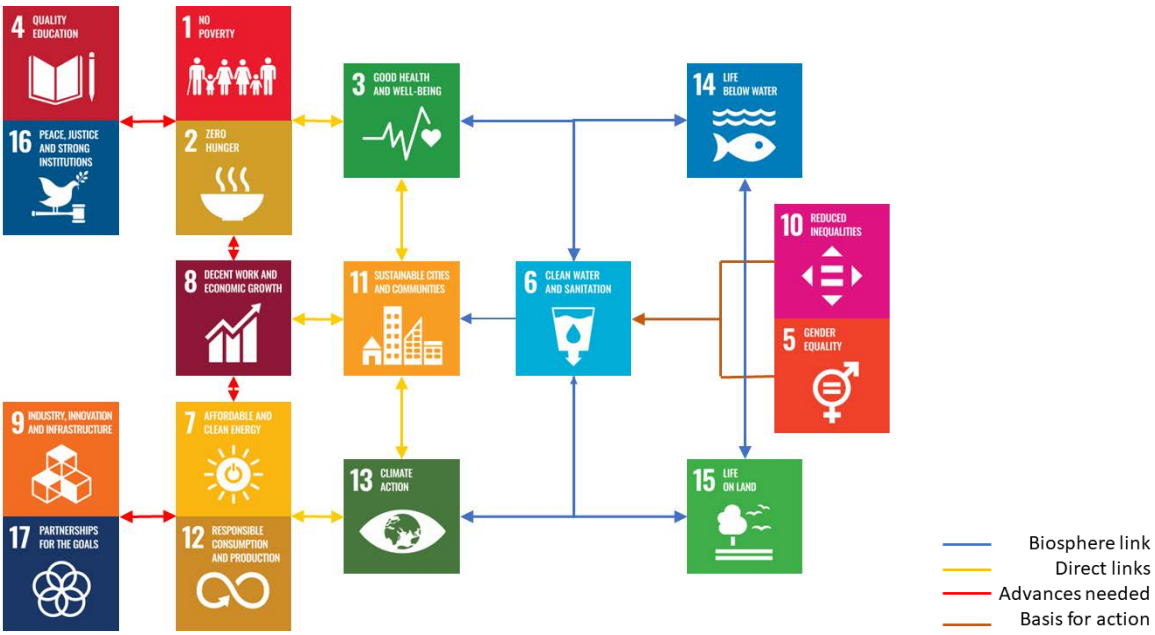
As proposed in the course Water Systems Design, a large-scale approach to a river system can help develop local solutions that are spatially and institutionally integrated. For Ourinhos, this function is assigned to the Médio Paranapanema Watershed Committee created in 1994 in compliance with state laws to manage water resources, aiming for their recovery, preservation and conservation.

The Paranapanema River forms the border between the states of São Paulo and Paraná. The federal government is responsible for managing water quality and quantity. In December 2010, the National Water Resources Council approved the creation of the Paranapanema River Watershed Committee at an interstate level. There is a close connection between all the watershed committees in the Paranapanema River Basin (PRB). They represent an established channel between water users, stakeholders and public institutions. The presence of the Guarani Aquifer System in the region, one of the world's biggest groundwater reservoirs, supports urban, industrial and agricultural activities in the watershed. The superficial water and groundwater shared by all the cities along the PRB can help connect the cities that belong to the watershed. This can be part of the work of the watershed committees on state and federal levels. How can the functioning of these committees be improved?

By making the most of scenic places in the area, tourism can be developed in ways that help promote the value of the watershed and stimulate action to fight environmental degradation and increasing water scarcity. However, this development of tourism will require new transportation infrastructures that depend on public investments. The presence of universities, technical schools, non-governmental organizations (NGOs), syndicates and other civic society organizations can offer the support needed for these cities to develop projects to value their watermarks and heritage. Such an intervention would need to be closely related to other large-scale interventions such as those related to the energy sector (Zocchi 2002).

Strategy: Contemporary Challenges and the SDGs

To bring back the universalist values characterizing the early days of the Ourinhos water system it is important to reconcile different visions and interests in the PRB region. In particular, there is a need for a comprehensive and multidisciplinary approach able to 1) account for different values placed on water among the population and 2) increase water awareness among Ourinhos citizens by highlighting ways the river is more than a resource for the city. During the Water Systems Design course, we used the UN Sustainable Development Goals (SDGs) as a framework to rethink existing water management and balance social, economic and environmental sustainability (UN n.d.). The 17 SDGs are integrated with each other, and as it happens with water management, the actions taken in one area will affect other sectors of society (Pellegrom 2023). In Ourinhos, water managers and other decision makers at the municipal level (mayors, secretaries, city counselors) may need new tools and methodologies to take a holistic approach to sustainable development, which accounts for local particularities, achieves buy-in from society at large and acknowledges historic path dependencies (Hein 2022). In building the value case for Ourinhos, SDG 6 is the central theme, surrounded by SDGs linked to the biosphere and contributing directly to SDG 11, which will lay the foundation for all other subsequent SDGs. Actions to valorize



^ Fig. 3 Strategy to connect the SDGs to water values in the Ourinhos study case (Source: Rodrigo Lilla Manzione, 2024).

water would involve SDGs 5 and 10 in search of a more fair, equal and inclusive society (fig. 3).

Value Case Proposal

As close as the river is to Ourinhos citizens' hearts, it is far from their eyes. The Watermarks project proposes considering the river as the central element of the basin and its region. It argues that several cities along the river basin have their own watermarks that connect people's heritage and the historical context of these cities. These watermarks can take several forms, from buildings and manmade structures like towers, pools, dams and channels, to natural features like rivers, lakes and aquifers. Sometimes these watermarks are silent and unseen (Burkett 2020) and need to be made visible to people. As addressed throughout the Water System Design course, valuing water is a deeply personal matter, embedded in broader worldviews and often influenced by the cultural and geographical context in which we grew up. Exploring the power of place offers a path to active preservation (Dahme et al. 2022). Developing awareness among the public and arriving at solutions to problems is tricky and challenging, as climate change is demonstrating for humanity. The idea behind the Watermarks Project is to create continuous actions to link people and water in Ourinhos, making the city's watermarks symbols of the presence of water and its importance for human and natural well-being. The plan is to create a new sense of responsibility for and awareness of the city's water and an interest in preserving it.

Action Plan

To begin the valorization of local water heritage, one possibility is to make use of a recognizable and popular structure: the water tower

^ Fig. 4 The location of the Ourinhos Water Tower (Source: Rodrigo Lilla Manzione, 2024, map modified from Google Earth).

of the Ourinhos Fire Department (fig. 4). The water tower has a privileged location in the city. It is in an upscale neighborhood that has several urban elements for leisure, sports and entertainment. On weekends, the place known as Trilha Verde (green trail in Portuguese) takes on the atmosphere of a block party and can be a center for social events. The general idea behind the enhancement of watermarks is to transform the tower surroundings into an "Instagrammable" spot, where people can, for example, take photos and videos to share on their social networks.

The plan proposes that the watershed committee present a project to the São Paulo State water resources state fund to obtain financial resources to make the project viable. The project could develop a cell phone app that would capture the shape of the tower and provide different artistic prints to decorate the tower and consequently the photo. The artwork that would be available on the app would be created by students, youth and the public during art contests. The best works will be available along with other predefined image backgrounds (e.g., plants, animals and traditional elements that refer to the local culture).

This proposal encourages actions to be carried out in municipal and state schools, with lectures on street art and graffiti with artists from local collectives, and on water resources and water values with experts from the universities involved. Teachers of science, arts and technology will also provide space in their disciplines for the development of activities. São Paulo State University would provide the water experts available in the Department of Geography and Planning of the School of Sciences, Technology and Education of Ourinhos and the Technical School of São Paulo would partici-

pate in the development of the cell phone app with the computational systems expertise available in its computing and game theory course. Students from both higher education institutions will be involved to assist teachers in the activities and development of the project in a scholarship modality.

The tower is white, and proposing that it be covered with actual artwork would be a cause for controversy and discussion among the municipalities. Through the creation of the cell phone app, we would seek to connect young people with a language that they understand, encouraging creativity and the development of skills in the school environment. Alongside the Instagrammable point created next to the tower, information would be offered about the structure, highlighting its historical importance, architectural relevance and current features, along with other information that might encourage people to feel a sense of belonging and involvement with water resources. Is there water inside this structure? Where does this water come from? Where does this water go? Key questions that are sparked in visitors' minds when they engage with the watermark can increase people's perception of the importance of a clean and healthy water body near the city – in this case, the Pardo River – and can raise awareness about the entire watershed.

The Ourinhos value case is based on multi-stakeholder engagement and collaboration. The project aims to bring together people who represent different branches of society. Universities, businesses and public institutions can provide technical support, while public engagement and advertisement can be led by local and regional NGOs with the aid of local radio stations, internet channels and social networks as well as schools, neighborhood associations and syndicates. Local artistic collectives will offer artistic and cultural development. Engagement with local or even nationwide influencers could help enlist young people. The realization of the project counts on the financial support available in water resource funds that are part of water legislation, with institutional support of the watershed committees, municipal government and educational, environmental and cultural secretaries. Funds from hydropower companies and water service companies can also boost the project regularly once they are obliged by law to contribute to water resource funds.

In the short term (one – two years) recreation activities, arts expositions and tournaments focusing on water preservation would raise water awareness among local residents and provide education about sustainable daily water practices that in the long term (ten years ahead) would hopefully become part of education and institutional development. The project can be replicated in other cities and regions. Several cities in the state of São Paulo have old water towers and other water elements that could be used to highlight water systems and water resources at local and regional levels.

Conclusion

When exploring the watermarks of a city or region, it is possible to link different actors, from local inhabitants to water experts, along with different scales and practices. Old structures and practices can be adapted to new technologies and social trends. Those familiar with the interests of young people can help identify and enhance new interventions. The already established water institutions in the region, like the watershed committee, can amplify the impact since several cities are congregated inside the committee framework and they are connected

by their shared water source. As proposed in the Water Systems Design course, using the correct framework, respecting local particularities and including attractive elements, it is possible to design projects that influence how people perceive, value and connect with water systems.

Policy Recommendations

- Identify, recognize and activate local watermarks for action.
- Enhance effectiveness, consider and respect local particularities.
- Link young people's interests with watermarks.

Acknowledgment
The author is grateful to São Paulo State Research Foundation (FAPESP) for financial support to participate in the "Water Systems Design" course (Project #2022/08810-0). This contribution was peer-reviewed. It was edited by members of the editorial team of the UNESCO Chair Water, Ports and Historic Cities: Carola Hein, Lea Kayrouz and Matteo D'Agostino.

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