

RECOVERY OF THE IRRIGATION SYSTEM AT THE THERMAL ORCHARDS IN CALDES DE MONTBUI, SPAIN

Water is life, and the landscapes generated by its social and productive management are their spatial expression over time. In the traditional city, water carried out most of the urban and peri-urban activities, allowing the city to be understood in relation to its territory. Referring to E.A. Wrigley (1987), this relationship is based on an organic productive model where the citizens had an active role as users of water through everyday life practices of self-management and production, adapting the use of this resource to its availability in its territory¹. Water used to be a public good and citizens knew how to deal with it since it was a social resource, a cultural asset.

The scientists J. Naredo and A. Valero² stated in 1999 that the growth of urban systems and their disconnection with their territory has conditioned our relationship with water since the industrial revolution. Its management has changed from a model where the communities were using it directly, to a public municipal model risking becoming a private commodity³. The caused disconnection between water and users that, together with economic development, led the users to adopt a passive role that turned the management model into a demand-based system. Thus, traditional infrastructures became obsolete, falling into a process of oblivion. Water has been “stolen” from the community, a community deprived of agency and affected by the loss of sense of community⁴.

However, if we understand water management from a systemic and integrated point of view, it is possible to read traditional management as an intangible heritage. Beyond its material dimension, this heritage recognizes the traditional knowledge and its physical, cultural, social and economic representation that enabled an organic management of resources⁵, which means a key model to transform our current urban social metabolism⁶.

¹ Wrigley, E.A. (1987). *People, Cities and Wealth: The Transformation of Traditional Society*. Oxford: Blackwell.

² Naredo, J., and Valero, A. (1999). *Economic Development and Ecological Deterioration*. Madrid: Argenteria Visor.

³ Guàrdia, M. (2011). *The Revolution of Water in Barcelona – In the Pre-industrial City of the Modern Metropolis (1867-1967)*. Barcelona: MUHBA.

⁴ Ward, C., and Hardy, D. (1984). *Arcadia for All: The Legacy of a Makeshift Landscape*. London: Mansell.

⁵ Laureano, P. (1995). *The Reserved Pyramid: The Oasis Model for the Earth*. Turin: Bollati Boringhieri.

⁶ Fischer-Kowalski, M., and Huttler, W. (1999). *Society's Metabolism. The intellectual History of Materials Flow Analysis, Part II, 1970-1998*. *Journal of Industrial Ecology*, 2(4), 107-136.

The management of water to irrigate the periphery of the city extends the intangible heritage of water to the agricultural activity itself. This is an age-old traditional activity in many urban periphery spaces that guarantees food sustenance to many families, allowing the city to be more self-sufficient. Local horticultural products produced in those spaces not only stand out for the traceability of their production as a guarantee of their quality, but also trigger the preservation of farmers' daily practices and their traditional knowledge⁷. This proximity production also fosters an urban food model of low consumption connected to fossil energies, because of the non-mechanization or industrialization of production, and because it does not require motorized transportation.

So, as we pointed before, management of water heritage is the community's daily practices as well. Working to improve the management of water and agricultural areas is not possible without working towards the reactivation of the community. Recovering the active role of stakeholders involved in resource management opens up the opportunity to recover public memory⁸.

Within this theoretical frame, we introduce the project developed by the authors of this paper. The project is located in a peripheral land called *Hortes de Baix* (low gardens). *Hortes de Baix* is a historical space of irrigation consisting of 3.7Ha annexed to the main core of the village, Caldes de Montbui, a thermal city founded by romans in the metropolitan region of Barcelona. This space has suffered the gradual environmental and social degradation of its landscape. This particular process of peripheral landscapes of the 20th century is here mainly caused by the water pollution of a local stream that supplies the irrigation system, a lack of security of accessibility to the space and the breakdown of the irrigation community.

These orchards were historically watered by the surplus of thermal washing places and the stream rainwater that poured into the main irrigation canal. This canal, formed by stone walls reaching three meters high, is the main element of the irrigation system. But with urban growth, the stream was covered and poured by much of sewage from the urban center. The canal has become an open sewer. This has caused health risk for the horticultural production, as well as for its public accessibility (extreme bad odors and visual effect). The limited availability of clean water triggered the claim for water as public good asset, as a heritage to reintegrate into the citizen imaginary.

The project was born within the municipal Public Space Board, which gives voice to local initiatives to improve it. The City Council commissioned the assignment to solve the need of more clean water for irrigation, to channel the wastewater open flow and to facilitate accessibility from the city center. We proposed to recover the private horticultural landscape as a new public space that encourages food self-sufficiency; to

⁷ Prades, V., and Vidal, A. (2013). In Praise of the Urban Gardens. Vilafranca: Editions and Cultural Platform.

⁸ Hayden, D. (1995). The Power of Place: Urban Landscape as Public History. Cambridge: The MIT Press.

co-design the process with the irrigation community and stakeholders; and to recognize the key value of traditional water management as a tangible and intangible heritage.

The intervention is developed through Participatory Action Research (PAR), a community-based participatory research. This approach comes mainly from the Paulo Freirean pedagogy and Latino-American experiences⁹. Participatory methodologies allow performing the conventional political sphere, but especially they enable awareness for the transformation of perceptual frameworks of the landscape¹⁰. Thus, we propose tools which facilitate this change of perspective¹¹, another approach which is essential for a proper transformation and balance of the environment.

Throughout this process and together with the gardeners, we detected an inadequate management of the water surplus from private thermal space poured into the stream. So we proposed to reuse it for irrigation as well as the surplus water from thermal washing places. The lack of thermal water in the orchards did not respond to a shortage in the thermal water supply but to an inadequate management of this resource. At the time that the project began, two-thirds of the 1000m³ of water that outcrop every day in a natural way were discharged to the river once they have been used by the private spas, without having spaces of retention, compensation or cooling for their reuse.

For two years of participatory action research, the irrigating community was recovered and empowered to agree on some bounded interventions without altering the existing irrigation system or its social management. The project was executed with 93881€ and a Municipal Employment Plan. The maintenance is taken over by the irrigation community and eventual problems are managed by the municipality.

The first goal of the project is to propose a plan to reactivate the community of gardeners in order to consolidate their structure, representation and commitment to efficiently manage the thermal water resource. In this sense, the community of irrigators has been empowered by creating an association to collectively manage the resources and the physical space of the orchards and their infrastructures.

On the other hand, the second goal is to promote a sustainable urban design from the understanding of the traditional management of resources by using the knowledge and the current technical possibilities (strategies of urban ecology based on the management of resources¹²), to respond to social and environmental challenges while mobilizing the urban social metabolism.

This second goal has been developed through two stages: the sustainable management of the irrigation system and the walkway to improve accessibility.

⁹ Freire, P. (1996). *Pedagogy of the Oppressed*, Harmondsworth: Penguin.

¹⁰ Lakoff, G. and Mora, M. (2007). *Do not think of Elephant! Know your values and frame the debate: The essential guide for progressives*. Madrid: Editorial Complutense.

¹¹ Cuchí, A., Marat-Mendes, T., Teira, R., Castro, E. Alba, D. and Rigau, N. (2010). *Urban Green Strategies of Santiago de Compostela*.

¹² Bettini, V. (1996). *Elements of Urban Ecology*. Turin: Einaudi.

As part of the community-driven process, the surplus of water from thermal spas was recovered to irrigate orchards ensuring water supply. For that, a new public pool was built to accumulate and cool thermal water. From there, we keep and recycle the existing irrigation system to deliver flooding turns operated by gravity only, avoiding introducing any new mechanized device. Wastewater is channelled to the sewage collector, allowing recovering the existing main canal with a new walkway to improve access to the area. This is supported inside the stone walls to not alter the canal traces appearance.

The presence of elements from the self-construction of horticultural identity is enhanced, including granite stones, ceramic handmade bricks, manual floodgates, wire meshes and fences. We reintroduce live willow, formerly used to make willow baskets heated by thermal water.

Finally, an innovative pilot system is developed -phytotreatment with macrophytes planted on floating gardens, to absorb residual organic material without altering the pool's oscillation condition.

The results of the project allow the project to be evaluated on three levels:

First, **the political**: The Government has committed itself to dignity to this place and to the long and intense participation process that culminates with the creation of a hitherto non-existent gardeners' association. A board with commissions is created to ensure self-management of the irrigated space, the establishment of internal rules, communication with the city council, the visibility of its historical heritage and the necessary intergenerational transfer of local knowledge.

Second, **the productive level**: Obtaining clean water allows the practice of organic farming and increases flooding turns. In the long term, visitors will be able to consume the cultivated products. And finally the civic level: the orchards become an open public space, promoting the recognition, inclusion and education of the agrarian space.

The new community and ecological approach also challenged our architecture team to assume the role of mediators and observers by searching for innovative references from other fields by integrating external collaborators. This has allowed us to develop new tools of decision-making, to rethink the communication of the technical issues of the project.