

*The roof tile-tegola in its variety of form and finishing, originated in many alluvial plains of China, Pakistan, Babylonia and Egypt. It was used to cover a space both domestic and ritual. Among the various forms and names they had during the monumental civilization of Persia – sofal – , of Greece – solenes – of China – wumianwa- and in Etruscan territories, a flat trapezoidal tile appeared in the current Italian language as “embrace” after the use Romans had made of it, in order to protect (things and people) from imber-pioggia-. The Book series « EFTD, Digital Theme-Format», presents an editorial space, open and protected under a team of supervisors, made out of Books-Catalogue: more sizes each of them fit to always renewed content. Since 2007 – Werkbund Centennial – two events refer to the term “embrace” - : the opening of a space in the web [www.embrace2030.com](http://www.embrace2030.com) – and of a physical place (Roma Garbatella) both locations for a new small social and cultural reality multicoloured (Gropius’ favourite colour at Harvard). Artists, artisans, photographers, copywriters and architects, contributed to create events and exhibitions regarding issues of Arts and Sustainable Architecture. Today, random subjects gathered worldwide are joining them under the guidance of the thinking, focused on preservation of the environment and its sustainability, originated and evolving from APS “Embrace 2030”.*

“New Boundaries. Public space toward a sustainable urban environment” proposes an interdisciplinary and international dialogue on the theme of sustainable and resilient public space, with particular reference to the border spaces of urban waterfronts, as part of a comparison of research and design practices developed by the European universities involved in the framework of the New European Bauhaus.

The theme of the boundary, takes on a scientific and technical dimension but also a philosophical and artistic one, as an area of research and design experimentation connected to the topic of public space and the space of water.

The experimentation concerns urban interventions developed at different scales, from design to architecture and urban planning, with the aim of promoting sustainable lifestyles and behaviours resilient to environmental and social changes in relation to emergency and long-term health and environmental risks.



First edition, Rome september 2022

## NEW EUROPEAN BAUHAUS

### NEW BOUNDARIES. PUBLIC SPACE TOWARD A SUSTAINABLE URBAN ENVIRONMENT

edited by **Federica Dal Falco, Mladen Jadric**



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Digital Theme-Format wants to contribute to a thinking that works on matter, as physical substance in general, following a systemic logic. According to this approach, the area commonly defined as scientific is widened to encompass all activities that are relevant to it. Therefore, besides the activities recognizable by a well-established scientific status, Craftsmanship, Design, Art and Architecture are included. Around these themes revolve initiatives, exhibitions, workshops (involving writers, artists, artisans, photographers, graphic designers, copywriters, and architects) in collaboration with Cultural Institutes, Foundations, and Universities. Random subjects are also gathered worldwide as long as they fit in the framework of a thinking focused on preservation of the environment and sustainability, a thinking that, either out there in the world or within the small gallery of Embrace 2030, consistently evolves.





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# NEW EUROPEAN BAUHAUS

## NEW BOUNDARIES. PUBLIC SPACE TOWARD A SUSTAINABLE URBAN ENVIRONMENT

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## HYDRO-INFRASTRUCTURES

Alessandra De Cesaris

*Upgrading the water system and reactivating the relationship between waterways and urban space are actions that can now play a crucial role in the regeneration of our cities. In this direction it's necessary to identify strategies for the redevelopment and enhancement of the water network in an alternative vision to the hard strategies that have characterized the last century. The most advanced experiences show that it is possible to transform the water crisis into an occasion for integrating public spaces, structures and facilities for free time, systems for production of clear energy and waste disposal and in several projects the variations of water level become a characterizing element of the landscape. According to this strategy, the great works, masterpieces of modern engineering, are being replaced by a series of water infrastructures, due to their smaller scale, can be scattered all over the territories; often they are also able to hybridize with other functions, setting aside their mono-functional status. Moreover, if the most advanced experiences are confronted with the management and regulation of excess rainwater in other parts of the planet, it is the question of scarcity. A shortage that is causing massive exodus, substantial modification of the landscapes as well as of the way in which the urban space is lived.*

### Towards a new generation of hydrological Infrastructures: managing abundance, managing scarcity

Re-developing the water system and reactivating the relationship between waterways and urban space are actions that can now play a crucial role in the regeneration of our cities.

In many cities around the world, redevelopment of the banks of river areas and the urban systems that connect to them has proved to be an excellent way of regenerating large urban areas: Nervion River in Bilbao, Besos in the northern suburbs of Barcelona, Seine in Paris Spree in Berlin, and many others (De Francesco, 2020a). The Tehran Comprehensive Plan (TCP) also identifies a series of regeneration corridors starting from Rud, seasonal rivers that run along 7 valleys of the capital (De Cesaris, 2022). The vision that emerges from the most advanced experiences moves away from the dominant ideology of the last two centuries: on the one hand, an alternative vision emerges to engineering works based mainly on regimentation and canalization such as dams and embankments; on the other hand, an attempt is made to integrate these water infrastructures with other functions and activities including public space. And if the most advanced experiences are confronted with the management and regulation of excess rainwater in other parts of the planet, it is the question of scarcity. A shortage

that is causing a massive exodus, a substantial modification of the landscapes as well as of the way in which the urban space is lived.

### Towards a new generation of elastic landscapes

From the end of the 18th century onwards, the idea of controlling nature through engineering advances became the dominant ideology, and the management of the water system was done using a mainly technical-engineering approach, according to the strategies of dams, weirs, embankments, pumps. These types of works, sometimes indispensable, have often defined many fragilities. For example, dams have wiped out life in the valleys and altered the delicate balance of the ecosystem;



Chulalongkorn Centenary Park, Bangkok, 2017 (Landprocess/N7A architects). ©Landprocess  
Rethinking Zayandeh rud, Online Workshop, Department PDTA, Sapienza, Daneshpajoohan Pishro Higher Education Institute, 2021, proposals of:  
Sima Khaleghian-Ziba Azar, Fatemeh Behrooz, Elam Abdolmohammad Arab. ©Alessandra De Cesaris



many river channels have shrunk, confined between increasingly high embankments and dams: the result is that water, discharged into the sea at a greater speed, makes it impossible to recharge the aquifers. Moreover, in Iran for example, some traditional water networks such as qanats (1) have been abandoned due to the construction of dams and wells.

Current strategies favor alternative modalities: not just barring, containing but living together, letting the waters expand. Room for the River - a nature based solution - is the strategy adopted in The Netherlands National program (2007-15) and the key of the approach is to restore the river's natural flood plain (De Francesco, 2020 b).

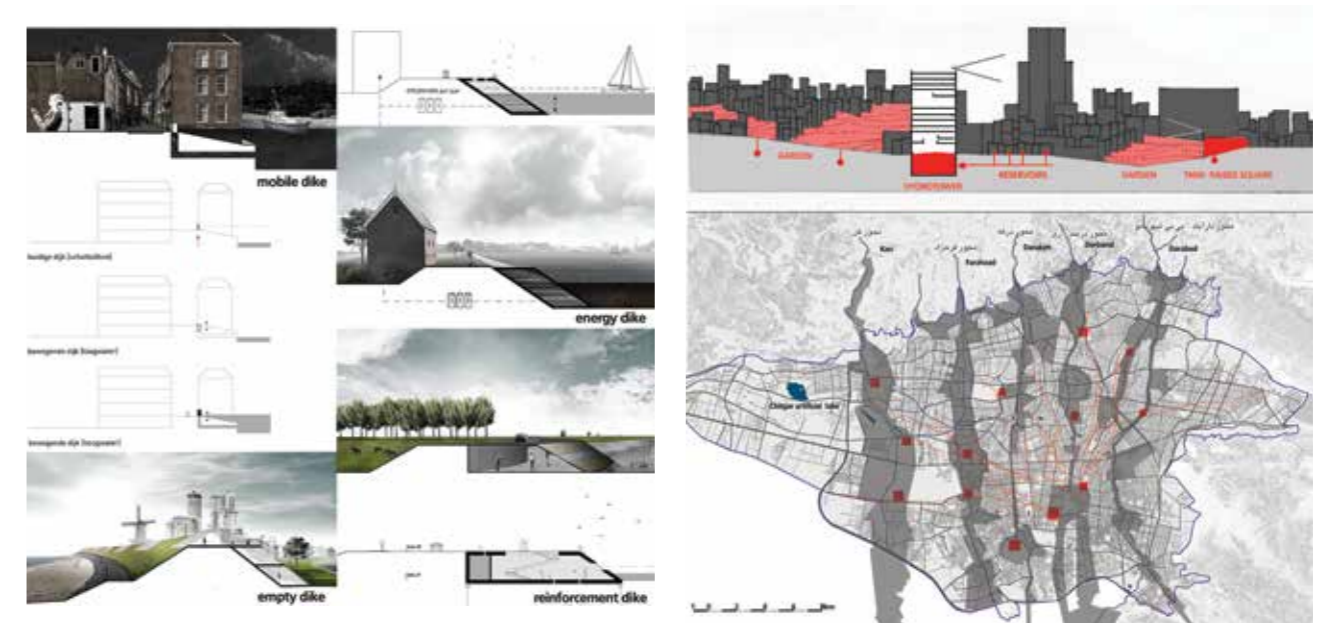
In this vision, water infrastructures designed for better stormwater level management may be able to define new water landscapes along riverbanks and seashores, a new kind of elastic and adaptable landscapes. After all, floods and river overflows have not always caused damage. Before the construction of the Aswan Dam, floods from the Nile fertilised the soil. Historian David Blackbourn reports that the villagers of the Oderbruch - in eastern Germany on the border with Poland - were 'amphibious' in the sense that they lived with the floods: in times of overflow, they fished and used the river for transport, while in dry periods they grew hay and legumes in the land fertilised by the river sediments (Rossano, 2021). The Dutch strategy called Room for the River has been applied several projects in the Netherlands: Landschapsarchitecten in Nijmegen - to name just one - designed and built a bypass canal to safeguard the town from flooding of Waal canal. The remodeling of the soil through excavation and fill works has reduced the risk of flooding and has defined a new "multilevel topography park" with an artificial island designed to be partially flooded.

In Santiago de Chile too the Zanjón de Aguada floodable park the water, from element of risk, has become the park's defining element (De Cesaris 2016); in Bangkok the Chulalongkorn Centenary Park (Landprocess/N7A architects) has been conceived not to be exclusively a space of leisure but also play a role in managing abundant rainfalls (2) (Bochicchio, 2020). Multilevel topographies thus define elastic landscapes where the variation of the water level becomes the characterizing element of the new park. These examples therefore demonstrate that it is possible to design places for recreation and free time that solve hydraulic problems with strategies that are far from, if not opposite to, the containment strategies adopted in the past. They also show that it is possible to find solutions capable of integrating hydro-infrastructures and urban space. We are therefore witnessing a paradigm shift, as the engineering approach, exclusively technical, is being overcome.

After all we have seen that in recent years, many transport infrastructure projects have been able to combine the technical infrastructure with the public spaces of the city by integrating transport and

public space. The same approach can be used for the hydraulic infrastructures: even the structures such as waste-to-energy plants and power plants, typologies considered monotasking are proving to be able to accommodate other functions (3).

The definition of elastic urban landscapes, with high variability in relation to water levels, is a very topical issue even in countries characterized by drought with often unsustainable management of water resources. That is what is happening at the River Zayandeh in Isfahan, a city which owes its origin to the presence of the river. Today the river bed, for centuries a central element of the life and of the shape of the city, is dry for most of the year. It is an empty space in a central area of a densely built city; a space that could be used to equip the city with the new services required by the needs of contemporary life. It is necessary to think of solutions that are valid both in periods of flooding and when the river is dry; for example, it is possible to think of buildings with floodable bases capable of restoring forms of life to the river that are currently absent (4).



Richer Dikes, DELVA 2012 ©DELVA Landscape Architects + Dingeman Deijis Architect  
Tehran, hypothesis of qanat reuse: the trajectory of water as a vector of urban regeneration ©Alessandra De Cesaris

### Towards a new generation of multitasking hydrological infrastructures

The new approach of the plans furthermore tries to transform these water crises into an opportunity to intervene in urban areas, integrating public spaces, structures and facilities for free time, sustainable mobility paths, systems for production of clean energy and waste disposal and new volumes, overcoming the dogma of mono-functionalism.

We can find many such solutions in history. The columns of the Hypostyle Square in Park Guell (Gaudi 1900-1914) channel rainwater into an underground reservoir used to irrigate the park and excess water is expelled through the mouth of the famous salamander.

In Bastia (Corsica), the small Place du Donjon square sits on top of a tank - built by the architects of the King of France between 1776 and 1778 - which supplied water to the upper town.

For centuries Iranian cities presented a complex integration with water infrastructures and the Kajou bridge built under Shah Abbas I in Isfahan (about 1650) is not only a connection among the two banks of the Zayande Rud (literally: the river that brings life) but it was and it is, a multitasking building. It connects the 2 banks of the river, it is a dam with the role of regulation of water and it is a public space organized on three different levels.

The upper level is used as a passageway and is flanked by walls with niches and pavilions overlooking the river. The second level can be flooded, but when the river is not full you can stay cool under the large arches. The lower level on the downstream side is connected to the river water by a system of steps that measure the water level. You can sit and watch the water flow by with your feet in the water.

This bridge was therefore conceived as a multifunctional building. It is a hydrological infrastructure: it regulates the flow of water, connects the two banks and at the same time integrates the public space.

The most innovative recent projects go in a similar direction: trying to integrate flood management with services and public space.

In this direction, the policy of large-scale works is being replaced by a policy of diffuse works; the great engineering masterpieces are being replaced by a series of water infrastructures spread throughout the territory. This new generation of hydrological infrastructures, due to their smaller scale, are able to better integrate with urban texture. It is therefore crucial to identify the right size of these works.

Copenhagen adopted the Climate Adaptation Plan (2011) and the Cloud burst Management plan (2012); the latter wonders whether excess water in the city can be seen as a vital resource rather than a problem:

In line with this strategy, it identifies the cloudburst tools: a system of 8 multifunctional infrastructures.

These are mainly streets with water reservoirs, subterranean conduits, vehicular, bicycle and pedestrian routes that integrate the landscape and public spaces, as well as floodable squares and parks and - crucially

- reuse residual spaces, empty car parks and underused areas.

According to this philosophy, Rotterdam, a true watercity, has created watersquares, which protect against the risk of flooding by relieving water pressure on the sewer system and storing water for future reuse in the event of drought; they represent an alternative to large-scale parks: capillary solutions capable of regenerating empty spaces by defining attractive public spaces in which water is not only an element to be regulated but an inseparable part of their identity and design.

In São Paulo, Brazil, a megalopolis subject to constant risk of flooding, MMBB arquitetura e urbanismo has proposed the creation of a series of tanks called piscinaoes to store and regulate rainwater. In spatial terms, the pools are large excavations distributed in a capillary way in the degraded urban fabric for the regeneration of informal suburbs without services and public spaces (5).

Finally, recent experiences in the Netherlands show that even a dam can integrate functions other than containment and damming.

De Urbanisten identify four kinds of dikes: the dike as instrument to transform areas, the dike as an urban public domain, the dike as a basis for urban development and the dike integrated into a building.

Delva instead identifies alternatives to the traditional method of dam reinforcement and several new types of dams have been developed, depending on the specificity of the sites: empty dike, (in Vlissingen) which hosts houses and services; energy dikes (in Nieuw Lekkerland) which enlarges the existing embankment and produces 1.500.000 kWh/year, migratory dike, (in Lauwersoog) which houses ecological corridors, mobile dike, (in Dordrecht) which rises and falls in relation to water level and sedimentation dike, (in Wall) which enlarges the existing dike in a natural way.

These “richer dikes” not only offer a sustainable solution for water safety, but also contribute to broader spatial, social, economic and ecological issues on and around the dike. Dams that are among the oldest hydraulic infrastructures in the Netherlands are therefore reinterpreted in a contemporary way to better integrate with contemporary needs.

Similarly, even if in a totally different context characterized by a shortage of water, the ancient network of qanat in Iran can be actualized and reinterpreted in the light of contemporary needs.

Today, the regeneration of this underground network may be able to sprinkle green and oxygen into the areas through which it passes and reactivate green spaces and gardens in contexts where there are no public spaces. Along the route of these water infrastructures, it is also conceivable to build water reservoirs integrated with a series of services and public spaces in cities that are severely lacking. This could be a way of reconciling places with their own identity, which an idea of unsustainable progress that pays little attention to environmental balances has partly compromised.

## NOTES

- (1) Qanats are one of the most sophisticated systems of water collection and irrigation “They have made a garden of what would otherwise have become an uninhabitable desert” (Wulff H. E., 1968). They are underground aqueducts, generally dug into alluvial soils, which collect the water in the aquifer at the foot of the mountain and convey it downstream by gravity.
- (2) Landprocess since the 2011 Bangkok devastating flood has been working with the tools of landscape architecture to painstakingly create space for “green cracks” in the asphalt covered urban jungle.
- (3) In Copenhagen f. i. the hydroelectric power plant in Kempton has been conceived as a panoramic device to appreciate the river landscape and the roof was conceived as an artificial ski slope.
- (4) This has been the topic of the workshop organized by Department PDTA, Sapienza and Daneshpajooan Pishro Higher Education Institute (September 2021), which tried to find solutions reinterpreting the complex relationship between the city of Isfahan and its waters in a contemporary key.
- (5) The importance of the strategies adopted in Rotterdam with the water squares and the unfortunately unrealized solutions proposed by MMBB are highlighted since 2012 in my book (De Cesaris, 2012).

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## ATOLLS | DUNES | ISLANDS

Mosè Ricci

*This article is presenting three urban regeneration projects “beyond” the coastal Borders.*

**FLOATING ATOLLS** | *This urban renewal project has been designed for a district located in Castellammare di Stabia. The project includes interventions on the urban space, on the landscape and also on city-owned buildings. The regeneration action of this area behind the old town represents an important objective of the city for the coming years. Becoming aware of the complexity of the entire urban system and its strong decay, it is possible to identify structural interventions in order to generate a real action of “regeneration”.*

**DUNES** | *The environmental sustainability project to restore the dunal environment aims to enhance the coastal landscape and raise awareness of a new model for the use of natural resources. The social and fruition aspect is resolved with cycle-pedestrian spaces, with the integration of urban furniture and the necessary greenery. The ultimate goal of the intervention is to allow users to have a series of services to enjoy the seafront even out of season and to fully take advantage by a regenerated natural environment.*

**CPN ISLANDS** | *In the new Copenhagen, where the ecological paradigm guides urban changes, traditional infrastructures seem to open up to new life cycles and take on different roles in the city. Adaptation and recycling are the words that best describe how they are regenerated. The docks are like beaches where you can tan and swim in clear water. And there will be islands. A Parkipelago of small islands where you can go to be isolated (as the word says), to sunbathe, meet friends or simply go somewhere while time passes.*

This article is presenting three urban regeneration projects “beyond” the coastal Borders. The first two of them are mine with other collaborators and are international competition winners. The third is under construction in Copenhagen. All of them are animated by the same objective of creating by design new spaces of beauty and happiness in our cities. The transformation of the existing city into the city of the future, as an objective of shared quality for life in the living space, is a complex operation that involves new skills, strategies and adaptive design devices. Urbanism from the science of urban expansion becomes the science of the regeneration of the existing city. And science, as Carlo Rovelli writes (2014) is above all a visionary activity. Scientific thinking feeds on the ability to see things differently than we did before.