

SUSTAINABLE URBAN PROJECT

The role of public spaces in adapting cities to the effects of climate change¹

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ABSTRACT

Contemporary urban planning is nowadays getting involved into thematic related with the slow and unceasing city transformations. This circumstance highlights the need for overcoming the sectoral approach to urban complexity, in favor of a more integrated one. The context to which reference is made is the urban area; the challenge is about the adaptation to the physical, social and economic transformations; the intervention tool to which the contribution refers is that of Urban Project. The authors focus is referred to the urban transformations induced by the effects of climate change, with specific reference to the increasingly frequent floods: highlighting their effects, in terms of design, on public spaces, and analyzing some good practices that have managed to transform the calamitous event into an urban development engine. The paper proposes a critical reflection on two case studies, "Water Square" in Benthemplein and "Climate tiles" in Copenhagen that represent ways of intervening on public space, at different scale, the first one in the field of urban planning, the latter in the field of Urban Design, complementary approaches for an ecological reconversion of city areas compromised by the effects of climate change.

Keywords: Urban and sustainable project, Public spaces, Climate change

Thematic clusters: 2. City and Environment **Topic:** Risk, vulnerability and resilience.

¹ The contribution is the result of a shared reflection by the two authors. However, the Introduction: "Urban transformations and regeneration strategies" and the first paragraph: "Sustainable urban project and new public spaces" are to be attributed to Carmela Mariano; the second, third and fourth paragraphs: "From the perception of risk to a rediscovered ethics in urban landscape planning", "Water Square in Benthemplein. An integrated design that combines urban quality and environmental sustainability" and "Climate tiles. The project that teaches you to walk on water" are to be attributed to Marsia Marino; the Conclusions are to be attributed to both authors.

Urban transformations and regeneration strategies

The contribution lies within the research activities carried out by the authors on issues related to the mitigation and adaptation policies of urban areas to the territorial effects produced by Climate Change (UNISDR, 2012; UNFCCC, 2015). These policies, which are located within the broader strategies of urban regeneration and resilience (Davoudi, 2012), imply the need to identify environmentally sustainable urban forms, capable of responding to the fragility and vulnerability of contemporary territories through actions of reconnection and of reconfiguration of morphological and environmental components (Musco&Zanchini, 2014; Mariano, Marino, 2019).

The need for a greater ability to observe the dynamics taking place in the contemporary city, (Corboz, 1998; Ascher, 1995; Indovina, 2014), requires, with respect to the past, the development of new skills and new methodological and operational references. This is both for the purpose of interpreting the phenomena in progress, both for outlining strategies and tactics able to direct and design increasingly complex realities. Another important issue related to this is the need to govern, at the same time, a resilient metamorphosis of the contemporary city (Gasparrini, 2017) and a sustainable transformation of the territory (UN, 2017), intended as a compromise between the three needs of the challenge: economic development, social equity and preservation of natural and cultural heritage.

An integrated intervention strategy (EC, 2007) on urban and metropolitan territories that implies «an overcoming of the sectorial approach in favor of an integrated approach to urban complexity» (Maciocco, 2015). This will be made possible thanks to a series of actions to be carried out on the speed of urban transformations, able to innovate tools and procedures of the plan and the project and to define a new paradigm for urban planning policies. We are talking about a process method able to stimulate large processes of transformation of the city and of its public spaces.

These actions are also desired by the guidelines of the European Commission (EU, 2016), which identifies 12 thematic priorities on which converge urban regeneration strategies. «Not only an urban planning strategy, which therefore mainly affects the physical and functional reorganization of the city, but also a project of social inclusion and economic and cultural development, as well as of ecological regeneration, central elements without which the city cannot be reborn» (Oliva & Ricci, 2017).

One of the foundations of this strategy is the construction of the "public city" (Ricci, 2017), intended as a project intervention on the open collective spaces system, residual areas, public services, abandoned areas, both in urban contexts of the historic city, both in the most marginal areas of the modern periphery.

An heritage of spaces that today represents, in virtue of their physical configuration and of the possibility of rethinking them in a network, the great potential in the regeneration processes of urban fabric (Mariano, 2013 a,c), thus playing a fundamental role in the reconstruction of the fragmentation of territories and in designing the connective fabric that structures and articulates the urban form (Mattogno, 2002).

In the contemporary city, whose physical form is the result of the processes of metropolisation (Campos Venuti, 2005; Indovina, 2009), spaces without quality and identity follow one another in sequences which do not interact with the context, assigning to the empty spaces the simple role of interrupting the path, rather than urban places (Mariano, 2012). For this reason, as many authors claim (Morandi, 1996; Piroddi, 2000; Tsiomis, 2005), the square is an urban product in danger of extinction and the traditional chain of public space (street - square - central places) no longer works while, on the contrary, there is a process of strong fragmentation and privatization of public space (Mariano, 2013b).

In this context of reference, the construction of public space requires, the activation of different approaches and tools with respect to the past, starting exactly from a structural reading of the transformation dynamics that affect contemporary cities and territories, where public spaces require longer construction processes to confer urban space the quality of contemporary urbanity (Belfiore, 2013).

It is not a coincidence that in the most recent and successful experiences of urban transformation and regeneration, the intervention on public spaces is part of an innovative range of planning and design tools. An example of this is the Urban Project procedure (Macchi Cassia, 1991; Balbo, 1992; Gasparrini, 1999) which gives public space the central role of generator element of urban quality (Ferretti, 2012; Ferretti & Mariano, 2014 a).

In fact, the strength of this procedure is that of intervening in the existing context and that its effect goes beyond the boundaries of the project site, and that means consider people in the design process.

«The presence of people, the occurrence of events, activities, stimuli, solicitations are by far the highest quality index of public spaces» (Gehl, 1991).

Sustainable urban project and new public spaces

The comparison with the complexity of the new territorial reality of the contemporary city «more changeable, and therefore more uncertain, in which it is difficult to foresee and anticipate» (Ascher, 2005), highlights the need to identify a urbanism that is more strategic and better to adapt to unforeseeable situations and to unforeseen events and to stimulate the «adaptive capacity of cities with respect to all the components of the vulnerability that decline the risk in its changeable forms» (Moraci&Fazia, 2015).

Regenerating contemporary cities and territories, in the general context of economic recession and scarcity of financial resources, means considering the complexity of the urban phenomenon and trying to give operational answers through flexible procedures open to the participation of public and private subjects. It means «be less definitive in projects in the illusion of their perfection and instead try to give orientations, think less of completing, close a cycle that accompanies the movement, fix less a forced future and rather sketch visions, possible scenarios. Be careful to let becoming, to listen to the impulses of urban life and to nourish this with the actions of urban intervention» (Charbonneau, 2014).

The changed conditions of the contemporary city in the last decade, after several cycles of growth, highlight the need not to proceed with large project operations projected over the long term and characterized by very high investment costs, but require reflections and urban projects oriented to the transformation of the existing city and inspired by the logic of *faire la ville sur la ville* (Grumbach, 1998). That means recomposing the city starting from a project of careful valorization and transformation of the existing cultural and historical heritage, carrying out interventions that respond to the principles of the sustainable city and implementing new strategies to mitigate the effects of climate change and to increase adaptability and resilience abilities.

The strategies to be implemented should be oriented towards proposing simple, fast and good quality solutions, which in some cases fall within the definition of *aménagements d'anticipation* (Charbonneau, 2007) and which are characterized by a particular attention to the local dimension of the project intervention, based on a gradual, incremental action, open to the involvement of a pluralist audience of transformation actors (Charbonneau, 2013, 2014; Gabellini, 2013; Bonfantini, 2018) also through the use of temporary uses of open spaces available (Mariano, 2015).

In this context, the recourse to the Urban Project procedure (Marcelloni, 2005; Ferretti& Mariano, 2014b) is still configured as the most appropriate planning tool for the design of the contemporary city, not as a project of urban expansion but as a project of transformation on the existing city, with the aim of reorganizing, completing, giving new "qualities" to already substantially built parts, assuming the construction of public space as a means for a formal recomposition and an identity integration of the fragmented fabrics of the contemporary city (Ricci, 2017; Carta, 2013).

The urban project is a method to design and carry out physical transformation interventions that are typical and relevant to the contemporary city. This procedure is characterized by highly complex operational contexts of the decisional and implementing subjects and the relationships they have; by a considerable fragmentation of the questions to which the interventions must respond; by a strong articulation of the kind of necessary actions: reuse, replacements, additions, completions; by the centrality that it confers to public spaces that are the most unprofitable and at the same time decisive urban components for raising the quality of the contemporary city (Tsiomis& Ziegler, 2007).

Therefore, the urban project mainly deals with the space, the equipment, the networks and the public or public use services. Through these actions and interventions, the urban project determines the physical form of interventions and urban space.

Therefore, the urban project is, a method of construction of the project capable of accommodating and directing a succession of contributions in the long term. It is a procedure which, due to its nature (Sola Morales, 1989), presents degrees of flexibility capable of adapting the design of public spaces to new social practices and to the new needs of the city, overcoming the concept of a sedimented and compact space, such as that of the historical and modern city, and imagining new types of public space in line with the transformations of the contemporary city (Marcelloni, 2005).

In this context, the contribution proposes a reflection on the impacts of climate change on the territory that are progressively increasing the fragility of human settlements, with particular reference to the urban contexts affected by the effects of increasingly frequent floods and focuses on the effects, in terms of design, of public space, illustrating some best practices that have succeeded in transforming the calamitous event into an engine of urban development and a generator of urban quality (Mariano, Marino 2018 a, b).

The paper proposes a critical reflection on two case studies, the "Water Square" in Benthemplein, in Rotterdam and the "Climate tiles" project in Copenhagen, which represent two methods of intervention on public space (on different scales, in fact the second is more related to the field of Urban Design) in which urban regeneration becomes a tool of ecological reconversion of city passages compromised by the effects of climate change. This analysis, through an inductive process, aims to identify some theoretical-methodological and operational references to be tested in urban contexts affected by calamitous events, through an ecological approach of the Urban Project procedure.

Indeed, in the opinion of this thesis, this design procedure is among the most appropriate when it comes to urban adaptation to the effects of climate change. This is due to its ability to consider the many aspects put in place and for its ability to extend its effects beyond the boundaries of the project site, becoming a city, making public space, even in the presence of calamitous events.

From the perception of risk to a rediscovered ethics in urban landscape planning

One of the conceptually most significant innovations of the European Landscape Convention (2000) was to establish an univocal definition of what "Landscape" is, definitively clearing the field of any purely naturalistic, aesthetic and qualitative meaning that until then had been given, defining the latter as «an area as perceived by people, whose character is the result of the action and interaction of natural and/or human factors» (European Landscape Convention, 2000). From this it derives, on the one hand, the pivotal role of human perception as judgement parameter, on the other the correlation between anthropic interventions and environmental factors of reference.

This introduces the concept, both current and controversial, of the perception of risk in those landscapes compromised by the effects of climate change that alter pre-established equilibria in places intended by definition as safe habitats, as produced by man for man: cities. In light of this, the contribution focuses, as previously expressed, on urban transformations induced by the effects of these changes, with specific reference to the increasingly frequent floods. The aim is to understand how the aforementioned interrelationship between natural and anthropic factors may be able to reconstitute a perception of safety within the urban landscape in the presence of extreme meteorological phenomena.

In these terms «intervening on the landscape means inserting an artifice into nature, manipulating it in order to protect it, to transform it or to manage it, as well as favoring a socially significant use» (Manifesto per il paesaggio, 2013).

As can be seen from article 1 of the first chapter of the CEP on the concept of "Landscape planning", that is the set of «strong forward-looking action to enhance, restore or create landscapes» (European Landscape Convention, 2000), the crux of the matter lies in the project scales. Urban planning has for a long time been blamed for leaving out detailed elements that determine the identity of the place, for architecture the opposite thesis, namely not to sufficiently consider the relationships between the different components of the urban fabric (Marino, 2017), placing itself in contrast with the need for foresight expressed in the CEP.

The urban project procedure, in this sense, is able to make a significant contribution, actually implementing a recomposition between the urban and architectural scale (Ferretti, 2012) by performing a series of actions that we could define by "successive approximations", attributing to the public space the dual role of connective element of the built and primary component for the perception of urban quality, an operation that actually puts "the Landscape at the Centre".

What expressed so far, it opens up to another interesting reflection, related to the field of philosophy.

In fact, the landscape itself is «main object of philosophical reflection» and cannot be «adequately understood and safeguarded if one refuses to take into consideration its aesthetic dimension» (D'Angelo, 2010).

In this case, the attention falls precisely on a possible role of aesthetics in relation to the concept of risk and to the perceptive modification of a landscape following violent natural phenomena (Ricci, 2003) taking into consideration its ability to acquire value in the presence of a bodily and emotional human involvement, thus characterizing the concept of aesthetics abovementioned, as "ecological aesthetics".

«If we were to develop this aesthetic dimension of ecology, we could engage with it, dealing with reproductive processes and the future design, that is renaturation, re-cultivation of the destroyed nature, not simply the regulation of functional ecosystems, but of the configuration. [...] of a human world-environment» (Böhme, 2010).

The overt awareness of the vulnerability and fragility of the territory, therefore, implies a capacity for government and public action, in a perspective of urban-territorial intervention, based on an integrated ecological approach (Aragona, 2013), which is interdisciplinary and inter-scalar, able to adapt both to the vast area and to the urban and local area (Ricci, 2017).

It is precisely in this perspective that the effects of climate change offer, in the opinion of this thesis, the great opportunity to operate an ecological reconversion of our cities in which public space assumes a role of primary importance as an identifying element of urban nuclei.

In the specific case of the now increasingly frequent floods and the consequent need to manage water within the urban context it is necessary to make a change of perspective in which cities and territories must be rethought by assuming water as an identifying generator element of a new urban form, making use of the Urban Project procedure (Macchi Cassia, 1991; Gasparrini, 1999; Tsiomis, 2007; Ferretti, 2012). The latter in fact, in consideration of its procedural nature, appears to be the most appropriate planning tool for intervening in such contexts, adopting the paradigm of resilience according to an ecological approach to territorial planning, which evaluates as priority elements the flexibility and diversity (Boller, 2017).

The strategies of urban regeneration, based on the above-mentioned criteria, represent, therefore, the field of experimentation for the characterization of the identity of those that are being configured, in various European and international contexts, such as the "new" landscapes of water (Maciocco, 2015; Mariano & Marino, 2018), in a perspective in which the built environment is able to adapt to the calamitous events and to the dynamic nature of the transformations of the landscape, in the perspective of the self-preservation of the habitat and of the coexistence of anthropic and natural elements, with the awareness that «to build means to collaborate with the land, to impress the sign of man on a landscape that will remain forever modified, to contribute to that slow transformation that is the life of the city itself» (Yourcenar, 1951).

In this frame of reference the concepts of aesthetics and ethics come close to each other and find their re-composition in a desirable sustainable turning point of the urban project.

In the following paragraphs two case studies of sustainable, or more specifically resilient, projects will be presented, in which public space plays a fundamental role in adapting the city to the effects of climate change, placing itself, as a matter of fact, as a key element for a new-found perception of city security in the presence of extreme weather events. These are two North European realities, the first in Rotterdam, specifically the "Water Square" project in Benthemplein, the second in Copenhagen, where the "Climate tiles" project will be the object of attention.

“Water Square” in Benthemplein. An integrated design that combines urbanquality and environmental sustainability.

The constant increase in precipitation and in general of extreme weather events, is affecting the Netherlands to an ever-increasing extent, so much so as to wonder how much the cities, especially the coastal ones are climate-proof.

In this regard, the city of Rotterdam is emblematic, as at the same time one of the safest in the world and one of the most vulnerable to extreme weather events, given its position in the Dutch Delta. How is Rotterdam

prepared for what can be defined as the new "urban issue", or rather that of city climate adaptation? One could say in the most far-sighted way possible, also from an economic point of view, considering climate change not as a threat, but rather as an opportunity to make the city resilient, attractive and economically stronger, this through a sound understanding between the public and private sectors, which, not surprisingly, represents one of the pillars of the urban project procedure (Rotterdam climate initiative. Climate proof, 2013).

The concept of "Water Square" in Benthemplein in Rotterdam, a project completed in 2013, is simple, a large coloured square in the middle of the piazza, with the dual function of a key element of the urban redevelopment of the area and a generator of an effective project of rainwater collection that avoids an overload on the city's sewage system in the presence of extreme rainfall.

When the rains are very strong the "lowered square" collects rainwater to return it to nature; when the climate is favourable and there is no precipitation, it becomes a recreational space, where students from the schools adjacent to the area spend most of their free time.



Fig. 01: Photo by Rende Petersen, kindly granted by "De Urbanisten" studio. Source: <http://www.urbanisten.nl/wp/?portfolio=water-square-tiel>



Fig. 02: Photo by MiladPallesh, kindly granted by "De Urbanisten" studio. Source: <http://www.urbanisten.nl/wp/?portfolio=water-square-tiel>

The project is based on an intense participatory process between the municipality of Rotterdam, the designers of the intervention, the Dutch studio De Urbanisten, the local community and the students of the schools in the

area, testifying to how this type of interventions on public space of cities, need a Bottom-up approach for a long-term success. Three workshops were organized in which possible uses, desired atmospheres and how rainwater could influence city life were discussed.

The result of this process of confrontation was that the square should have been a dynamic place, with plenty of space for playful-recreational activities, green spaces, but above all where the generator element, namely the water, should have been visible in the his run along the square on the appropriate channels.

The intervention consists of three basins at different heights that collect rainwater, but also the one coming from the drainage channels of the surrounding buildings, to reinforce the need for integration of the project with the urban context in which it is inserted, another key point of the procedure of the urban project. Two of these basins receive water at each precipitation, another, which is deeper, fills up only in case of persistent rains. Thanks to a skilful design of the slopes, the water is channeled into the basins by means of stainless-steel gutters.

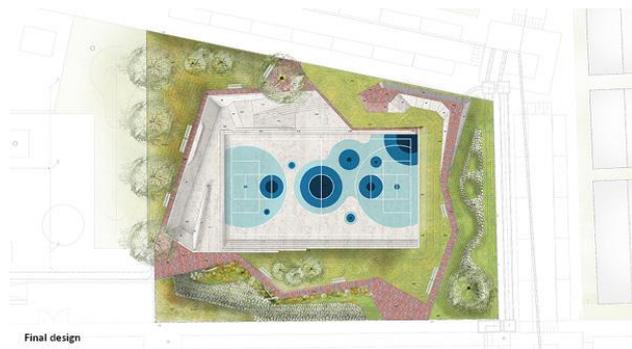


Fig. 03: Final design, kindly granted by "De Urbanisten" studio. Source: <http://www.urbanisten.nl/wp/?portfolio=water-square-tiel>

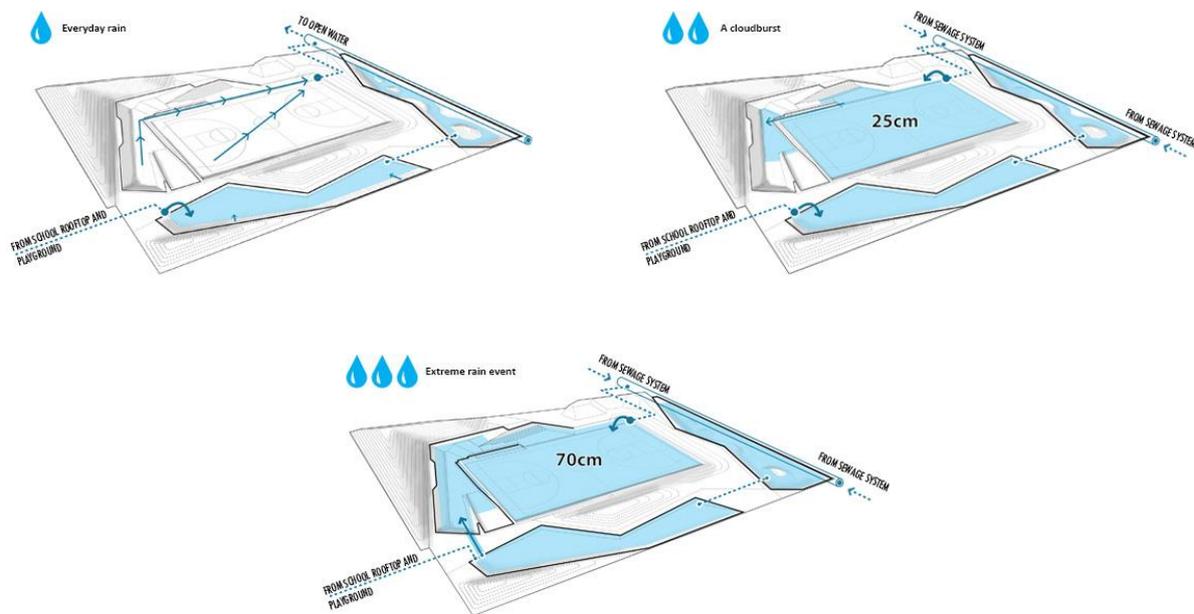


Fig. 04: Sketches, kindly granted by "De Urbanisten" studio. Source: <http://www.urbanisten.nl/wp/?portfolio=water-square-tiel>

To make the intervention an exemplary case of ecological regeneration, and to reinforce the concept of interrelation between ethics and aesthetics expressed in the previous paragraph, two elements of landscape architecture, a water wall and a rain well, bring rainwater into the square. The rain well was designed as a point of arrival for the stainless-steel channel, which raised from the ground brings water from the roofs of nearby buildings. The water wall instead transports the water to the deep basin with a cascade rhythm directly proportional to the amount of water of the precipitation in progress.



Fig. 05: Photo by Rende Petersen, kindly granted by "De Urbanisten" studio. Source: <http://www.urbanisten.nl/wp/?portfolio=water-square-tiel>

Once the rain is over, the water of the two less deep basins flows into an underground storage device and slowly penetrates into the water table. In this way the soil receives the necessary amount of water and can

cope with periods of drought, favouring vegetation which also contributes to reducing the heat island effect typical of cities.

The water collected in the deeper basin flows into the city's water system within 36 hours (thus avoiding the formation of pools of stagnant water) without entering the sewage system.

Also from the chromatic point of view the intervention is an admirable example of urban regeneration. The choice and combination of colours underlines the function of the square; the areas that will suffer flooding have a blue hue, everything that carries water is in polished stainless steel. This means that gutters are catalysts for attention.



Fig. 06: Photo by Jan Bouwhuis, kindly granted by "De Urbanisten" studio. Source: <http://www.urbanisten.nl/wp/?portfolio=water-square-tiel>

The Bentemplein water square is part of the interventions designed for the entire Zoho creative district (whose completion is expected by 2020) in the framework of the Rotterdam Climate Change Adaptation Strategy project. (De Urbanisten, 2013).



Fig. 07: Photo by MiladPallesh, kindly granted by "De Urbanisten" studio. Source: <http://www.urbanisten.nl/wp/?portfolio=water-square-tiel>

“Climate tiles”. The project that teaches you to walk on water.

The common thread that links the most significant interventions of space transformation aimed at a resilient adaptation of cities to the effects of climate change is the positive approach to the crisis dimension. Regardless of the project scale. In this regard Flemming Rafn Thomsen, partner of Tradje Natur affirms «The

climate changes is both a gift and a wake-up call from above. The nature is suddenly more visible and are in these years mobilizing an understanding of that we with our settlement, way of life and consumptions of resources have triggered far-reaching and irrevocable changes for our surroundings. In a positive way, this momentum should be used to create humane, eventful and thereby sustainable cities».²

The second project analyzed is exactly of the based Danish firm Tradje Natur, based in Copenhagen, and it is called "Climate Tiles", not properly an urban project, but more of a design project for public space, extremely useful in understanding how, this component of the city can and has the task of becoming, on the one hand, an instrument of civil awareness to the effects of climate change, on the other, a filter through which the city flourishes, reacts to "acute shocks" (100 Resilient Cities, 2019) creating a peaceful coexistence between the anthropic and the natural element. We are talking about an outdoor tile, designed for future sidewalks capable of handling the extreme and increasingly frequent rainfall that is pouring into our cities.

The pilot project was realized in the summer of 2018 in the Nørrebro area of the city of Copenhagen, along the road adjacent to the headquarters of the Tradje Natur studio. It consists of a 50 m long sidewalk to study the effectiveness and functioning of the climate tile and verify the response during the different seasons of the year.

The data collected will be used to make final changes to the tile before sending it to industrial production and to the market. On the topic Jeppe Ecklon, project manager of the project declares «We have chosen Heimdalsgade, that is close to our own office, cause the street today can be experienced as a sad and unattractive parking street where the Café on the corner is the only consolation. The café has shown great interest in using the sidewalk outside the café as an outdoor living room, extending the café's serving area. We expect that the café's passion for entrepreneurship and the Climate Tile system and its qualities can create an attractive space in one of Nørrebro's gray streets. We wish to show the world that climate adaption is not just about hidden technology, but also a chance for everybody to participate in the improvement of our everydayspaces, where we learn to understand the city's hidden infrastructure at the same time as it offer greater life quality».³



Fig. 08: Photo, kindly granted by "Tradjenatur" studio.
Source:<https://www.tredjenatur.dk/portfolio/klimafalisen/>

²Designers' statement about the "Climate tiles" project. Retrieved from: <https://www.tredjenatur.dk/portfolio/klimafalisen/>

³See footnote 1.

The purpose of this intervention is to collect rainwater from roofs and sidewalks, to allow its reuse and to manage the overload on the sewage system in periods of extreme rainfall, thus reducing water damage. In this way, the supply of water to the existing sewerage network of the city is considerably reduced and allows savings on new installations and extensions of existing water management.

This is allowed by an underground piping system that channels the water, first of all towards the surrounding plants, but water collection systems are planned also for different uses.



Fig. 09: Photo, kindly granted by "Tradjenatur" studio.
Source: <https://www.tredjenatur.dk/portfolio/klimafilisen/>

In winter, moreover, in order to allow the water to flow out and pass through the holes in the flooring, the tiles are salted, to prevent the water inside the holes to freeze; during the salting period the collected water is directed directly to the sewer system.

The Plug function is able to manage the water from the surface and has the shape of small holes, in which elements of urban decor may be eventually inserted or be used for planting tree species. These tiles are designed for a 50-year cycle, so as to ensure long-term management of climate challenges.

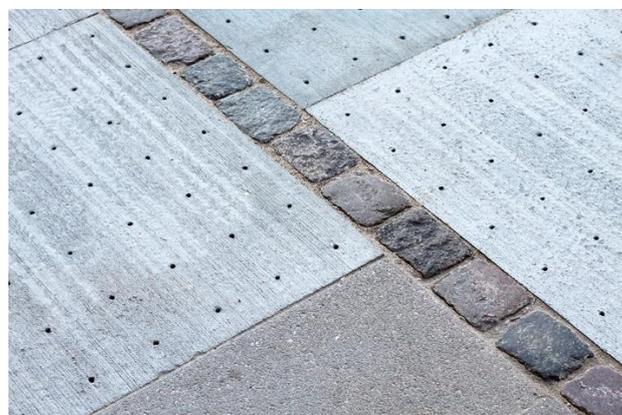


Fig. 10: Photo, kindly granted by "Tradjenatur" studio. Source: <https://www.tredjenatur.dk/portfolio/klimafilisen/>

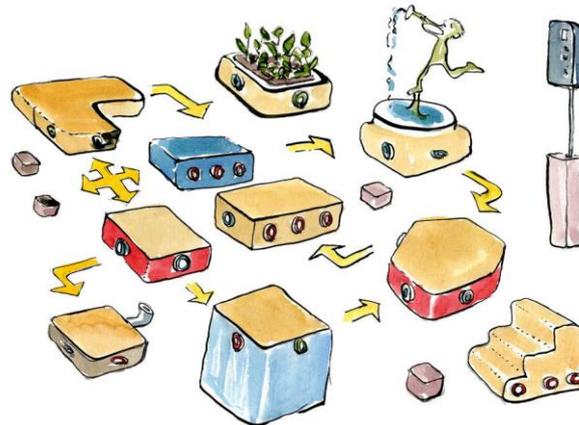


Fig. 11: Sketch, kindly granted by "Tradjenatur" studio. Source: <https://www.tredjenatur.dk/portfolio/klimaflisen/>

The goal is to create a smart tile with low-tech and high-tech plug-ins. On the merits, sensors could be inserted in the holes that can read and send information on the current water level both to the water network and to the citizens. In this, all citizens will be informed and aware of climate adaptation measures in the city.

Copenhagen has more than 700 kilometers of sidewalks, thus several million square meters. All cities have sidewalks, even the smallest and most dense. The potential of this project is easy to understand; in New York there are 20,000 kilometers of sidewalks and stormwater management is undoubtedly a political priority. (Tradje Natur, 2018).

The innovative scope of this project is to guarantee adequate rainwater management, while at the same time adding more value to the city. With reference to the role of the perception of the urban landscape expressed in the paragraph "From the perception of risk to a rediscovered ethics in urban landscape planning", it is clear how interventions of this kind contribute to rediscovering a perception of safety, from the part of citizens, fundamental to quality urban.

In the authors' opinion, this project appears particularly interesting because it represents an emblematic case of interaction between design elements traditionally attributable to defined design scales. It is clear that the urban question of adaptation needs a visionary ability capable of considering the city as an organism, designing from small to large scale and vice versa, considering the appropriate interrelations between the different constituent elements.



Fig. 12: Final design, kindly granted by "Tradjenatur" studio. Source: <https://www.tredjenatur.dk/portfolio/klimaflisen/>

Conclusions

The paper is focused on urban transformations determined by the climate change phenomenon, with specific reference to the events of the floods. The study highlights the design actions, on public space, and analyzes some good practices implemented in the cities of Amsterdam and Copenhagen.

Specifically, the authors wanted to underline, through the presentation of two emblematic case studies, how the urban project procedure represents a design tool capable of regenerating cities hit by calamitous events, giving value to the public space, transforming a point of weakness in an urban attractor.

Specifically, the authors intent is to emphasize how the urban project is configured as the most appropriate design tool for designing contemporary cities, not as an urban expansion project but as a transformation project on the existing city, which has as its objective to reorganize, complete, give new "quality" to parts already substantially built, assuming the construction of the public space as a key element for the formal recomposition of the contemporary city. This concept is clearly seen in the choice of case studies: the first, "Water square in Benthemplein" has the aim of giving a wider view of the ecological transformation of a city area, the second, "Climate Tiles", has the aim of bringing out how the fields of Urban Planning and Urban Design are closely interconnected and which together can give rise to ecological conversion projects of the existing city, capable of offering a perception of security of the urban landscape even in the presence of natural phenomena that risk altering its equilibrium.

REFERENCES

- Aragona, S. (2013). Dalle mutanti condizioni climatiche grandi opportunità di costruzione di senso del territorio. In F. Musco & E. Zanchini (cur.). *Le città cambiano il Clima*. Venezia: Corila.
- Ascher, F. (1995). *Métapolis. Oul'avenir des villes*. Paris: Editions Odile Jacob.
- Ascher, F. (2005). Le sfide delle città europee all'inizio del XXI secolo. In Marcelloni, M. (2005), (cur.). *Questioni della città contemporanea*, collana studi urbani e regionali. Milano: FrancoAngeli.
- Balbo, P.P. (1992). *Il progetto urbano*. Roma: Gangemi editore.

- Belfiore, E., (2013). Lo spazio pubblico. La contrazione del dominio pubblico nella città contemporanea e i modelli e i principi per la sua ricostruzione. In Baiani S., & Santangelo V. S. (cur.), *Lectures#1 design, pianificazione, tecnologia dell'architettura*. Roma: Rdesignpress.
- Böhme, G. (2010). *Atmosfere, estasi, messe in scena. L'estetica come teoria generale della percezione*. Milano: Marinotti.
- Boller, G. (2017). Paesaggio come infrastruttura urbana per la mitigazione del rischio d'esondazione. In *Atti XX Conferenza Nazionale SIU*. Roma: Planum Publisher.
- Bonfantini, B. (2018). Quattro parole per un orizzonte tematico. *Territorio*, 85: 189-192.
- Campos Venuti, G. (2005). Il mio lungo percorso verso la metropolizzazione. *Metronomie*, XII
- Carta, M. (2013). *Reimagining Urbanism. Città creative, intelligenti ed ecologiche per i tempi che cambiano*. Trento: LISt Lab.
- Charbonneau, J.P. (2007). *Aménagement d'anticipation*. Retrieved from jpcharbonneau-urbaniste.com
- Charbonneau, J. P. (2013). Faire beaucoup avec peu, vite et bien... *Tousurbains* n. 1/13.
- Charbonneau, J.P. (2014). Comment intégrer en pratique l'évolution, 20 ans des modes de vie, des lieux, de l'action urbaine? *Tous Urbains* n.7.
- Consiglio d'Europa (2000). *Convenzione europea del paesaggio*. Firenze.
- Corboz, A. (1998). *Ordine sparso. Saggi sull'arte, il metodo, la città e il territorio*. Milano: FrancoAngeli.
- D'Angelo, P. (2010). *Filosofia del paesaggio*. Macerata: Quodlibet.
- Davoudi, S. (2012). Resilience: A Bridging Concept or a Dead End? *Planning Theory & Practice*, n.2, vol. 13: 299-307.
- De Urbanisten (2013). *Water Square Benthemplein*. Retrieved from <http://www.urbanisten.nl/wp/?portfolio=waterplein-benthemplein>
- EU Ministers for Urban Matters, (2016). *Urban Agenda for the EU. Pact of Amsterdam*. Amsterdam: Presidency of the Council of the European Union. Retrieved from https://ec.europa.eu/regional_policy/sources/policy/themes/urban-development/agenda/pact-of-amsterdam.pdf (ultimo accesso: 2019/07/10)
- European Commission, (2007). *State aid control and regeneration of deprived urban areas. Vademecum*. Retrieved from http://ec.europa.eu/competition/state_aid/studies_reports/vademecum.pdf
- Ferretti, L. V. (2012). *L'architettura del progetto urbano. Procedure e strumenti per la costruzione del paesaggio urbano*. Milano: FrancoAngeli.
- Ferretti, L.V., & Mariano, C. (2014a). Urban quality and Project for the public space, in *EDA Esempi di Architettura. International Journal of Architecture and Engineering*, vol. 1 n. 2/14.

- Ferretti, L.V, Mariano, C. (2014b). Flessibilità e controllo nel progetto urbano. In *L'urbanistica italiana nel mondo, Atti XVII Conferenza Nazionale Società Italiana degli Urbanisti*, Milano 15-16 maggio 2014. Roma, Milano: Planum Publisher.
- Gabellini, P., (2013). Capire il carattere della crisi, agire gradualmente e selettivamente, accettare la parzialità. In Fregolent, L., & Savino, M. (cur.), *Città e politiche in tempo di crisi*. Milano: FrancoAngeli.
- Gasparrini, C. (cur.), (1999)., *Il progetto urbano. Una frontiera ambigua tra urbanistica e architettura*. Napoli: Liguorieditore.
- Gasparrini, C. (2015). *In the city on the cities*. Trento: List Babel.
- Gasparrini, C. (2017). Una buona urbanistica per convivere con i rischi. *Urbanistica*, n. 159.
- Gehl J. (1991). *La vita in città. Spazio urbano e relazioni sociali*. Sant'Arcangelo di Romagna: Maggioli editore.
- Grumbach, A. (1998). La ville sur la ville. *Projet Urbain*, Direction générale de l'urbanisme, de l'habitat et de la construction, 15: 26-27.
- Indovina, F. (2009). *Dalla città diffusa all'arcipelago metropolitano*. Milano: FrancoAngeli.
- Indovina, F. (2014). *La metropoli europea. Una prospettiva*. Milano: FrancoAngeli.
- Macchi Cassia, C. (1991). *Il Grande Progetto Urbano. La forma della città e i desideri dei cittadini*. Roma: Carocci.
- Maciocco, G. (2015). Paesaggi dell'acqua come progetto del territorio sicuro. F. D. Moccia e M. Sepe (cur.) *Urbanistica Informazioni n.263, special issue, IX Giornata Studio INU Infrastrutture blu e verdi, reti virtuali, culturali e sociali*. Roma: Inu Edizioni.
- Marcelloni, M. (cur.), (2005). *Questioni della città contemporanea*, collana studi urbani e regionali. Milano: FrancoAngeli.
- Mariano, C. (2013a). Progetto e gestione dello spazio pubblico: il difficile rapporto pubblico-privato. *La città sobria*, F.D. Moccia (cur.), collana *Governo del territorio e progetto urbano. Studi e ricerche*, n. 7. Napoli: Edizioni Scientifiche Italiane.
- Mariano, C. (2013b). Politiche di densificazione e qualità degli spazi aperti. In *Città pubblica/Paesaggi comuni*, a cura di A. Lambertini, A. Metta, M. L. Olivetti, Gangemi editore.
- Mariano, C. (2013c). Spazi pubblici 'migranti'. Processi di rivitalizzazione degli spazi pubblici nella città contemporanea. *Planum. The Journal of Urbanism*, n. 27/13.
- Mariano, C., (2012). *Progettare e gestire lo spazio pubblico*. Roma: Aracne.
- Mariano, C., (2015). Rigenerare città e territori: il progetto dello spazio pubblico. *Urbanistica Informazioni*, 263.
- Mariano, C., & Marino, M. (2018a). Gli effetti del climate-change come opportunità di rigenerazione ecologica dei territori costieri. *Urbanistica Informazioni special issue, XI Giornata di studi INU Interruzioni, intersezioni, condivisioni, sovrapposizioni. Nuove prospettive per il territorio*, F. D. Moccia, & M. Sepe, pp. 24-27.

Mariano C., Marino M. (2018b). Water Landscapes: from risk management to an urban regeneration strategy. *Upland – Journal of Urban Planning, Landscape & Environmental Design*, Vol 3 – Sustainability.

Mariano, C., Marino, M. (2019). Public space and climate change. Innovative planning approaches for the urban regeneration of coastal cities. In the *Proceedings of the International Conference on Changing cities IV, Spatial, Design, Landscape & Socioeconomics Dimensions*, Gospodini A., University of Thessaly.

Marino, M. (2017). Pianificazione del paesaggio. Il progetto urbano come sintesi. In A. M. Ippolito. *Pensieri di paesaggio. Un itinerario lungo vent'anni* (pp. 30-35). Milano: FrancoAngeli.

Mattogno, C. (2002). *Idee di spazio, lo spazio nelle idee, Metropoli contemporanee e spazi pubblici*. Milano: FrancoAngeli.

Moraci, F., & Fazia, C. (2015). Tre Crediti per la resilienza urbana a costo zero. *Urbanistica informazioni, special Issue-IX Giornata di studio INU infrastrutture blu, vedi, reti virtuali, culturali e sociali*, n. 263.

Morandi, M. (1996). *Lacittà vissuta, Significati e valori dello spazio urbano*. Firenze: Alinea Editrice.

Musco, F. e Zanchini, E. (2014). *Il clima cambia le città. Strategie di adattamento e mitigazione nella pianificazione urbanistica*. Milano: FrancoAngeli.

Oliva, F., & Ricci, L. (2017). Promoting urban regeneration and the requalification of built housing stock. In Antonini, E., & Tucci, F. (Eds.), *Architecture, City and Territory towards a Green Economy* (pp. 204-219). Milano: Edizioni Ambiente.

Piroddi, E. (2000). *Le regole della ricomposizione urbana*. Milano: FrancoAngeli.

Ricci, M. (2003). *Rischiopaesaggio*, Roma: Meltemi.

Ricci, L. (2017). Governare la Città Contemporanea. Riforme e strumenti per la rigenerazione urbana. In M. Talia (cur.). *Un futuro affidabile per la città. Apertura al cambiamento e rischio accettabile nel governo del territorio*. Roma: Planum Publisher.

Rockefeller Foundation (2019). *100 Resilient Cities*. Retrieved from <http://www.100resilientcities.org/about-us/>

Rotterdam climate initiative. Climate proof (2013) *Rotterdam Climate Change Adaptation Strategy*. City of Rotterdam.

Sola Morales, M. de (1989). Un'altra tradizione moderna. Dalla rottura dell'anno trenta al progetto urbano moderno. *Lotus*, n.64.

Tsiomis, Y. (2005). L'aporia dell'architetto. La qualità dello spazio urbano nella città contemporanea. In Marcelloni, M. (cur.), *Questioni della città contemporanea*, collana studi urbani e regionali. Milano: FrancoAngeli.

Tsiomis, Y., Ziegler, V. (2007). *Anatomie de projets urbains*. Paris: Editions de la Villette.

TradjeNatur (2018). *Climate tiles*. Retrieved from <https://www.tredjenatur.dk/en/portfolio/climatetile/>

UNFCCC (2015). *Paris Agreement*.

UNISCAPE Napoli (2013). *Manifesto per il paesaggio*. Napoli: Università degli studi di Napoli Federico II.

UNISDR (2012). *How to make cities resilient*.

United Nations, (2017). *The New Urban Agenda*, United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador, on 20 October 2016.