Health-Promoting Places: Rain Gardens and Sustainable Water Management

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Abstract. What are the qualities of health-promoting places? Is the presence of water necessary? The rain gardens which are collecting the stormwater could become the dynamic elements of the urban landscape. Apart from ecological services they can also benefit human health. This paper presents two examples of sustainable water management in Gdynia, Poland and one in Asnières, close to Paris in France. The rain garden constructed near InfoBox in Gdynia is a good example of the implementation of the city environmental policy on a small scale. This rain garden in a planter helped to create an inviting place. Another rain garden developed as a part of the urban regeneration strategy in the northern part of Gdynia proves that such investment could make a huge difference in the quality of local living. A previously neglected space became lively and inviting. The Rue Soeur Valerie in Asnières is a good example of how to create a friendly, walkable street using a sustainable water drainage system. This paper discusses the positive health impact of water management.

1. Introduction
The promotion of human health should be the major goal of any development. The influence of landscape on health has been subject to numerous research [1, 2, 3]. The definition of therapeutic landscapes was first coined by Wilbert Gesler in 1992 to explain why certain environments seem to contribute to a “healing sense of place” [4]. He defined “therapeutic landscapes” as places “where the physical and built environments, social conditions and human perceptions combine to produce an atmosphere which is conducive to healing” [4, 5]. Soon, researchers extended the concept to “urban health-affirming landscapes”, defined as “everyday places which unite the qualities of therapeutic landscapes to influence people physical, mental and spiritual healing” [6]. However, the “therapeutic landscapes” should be perceived as “potentially therapeutic landscapes”, as the individual reception may vary and is influenced by personal attitude [7]. There are numerous qualities of health-promoting places that rely on ecological, social and economic factors. Two types of the environment have received recognition for enhancing health and wellbeing: namely the green space (i.e. urban parks) and blue space (i.e. rivers, canals, coast, lakes) [8]. Green and blue spaces tend to be perceived as distinct and separate entities from their urban, ‘grey’ surroundings. Growing evidence is documenting “green” and “blue” spaces as “therapeutic landscapes” [3, 9]. Contact with nature offers stimulants enabling people to focus on the present time, rather than worrying about impending pressures. Being here and now is crucial for the initiation of the healing process.
2. Qualities of health-promoting places

2.1 The presence of greenery is recognized for promoting human health and accelerating recovery from illness [1, 2, 3, 4]. People need everyday contact with nature, which can improve mood and reduce stress level. The concept of ‘green’ is relatively vast and encompasses natural landscapes: forests, urban parks and gardens, and even street greenery. The definition of contact with nature includes passive observation, i.e. viewing through a window, and moderate to vigorous physical activities i.e. walking, gardening, hiking and playing in green settings. The professional hortitherapy is a kind of therapy which uses contact with plants to facilitate healing. The amateur collective gardening is gaining popularity in the urbanized area because it offers the possibility for mental regeneration, physical activity, and social contacts. The ‘green’ settings are traditionally linked with leisure and well-being.

2.2 The presence of water was mentioned by the researchers as one of the most important aesthetic elements [10, 11, 12]. ‘Blue’ settings therapeutic qualities are gaining recognition. Views of the water are perceived to be attractive, fascinating and positive [13]. People admire the view, the sounds and the variable movement of water [14]. The perception of blue water is related to regaining energy, youth, and health [15]. Color and clarity are important for the public perception of water quality. Bluewater is generally preferred to yellow water. Researchers recognized a general preference of natural, meandering water banks covered with plants [12]. The literature review leads to the conclusion that the presence of greenery and water is an invaluable feature of health-promoting places.

3. Presence of water in the sustainable urban drainage systems

The presence of water in health-promoting places was correlated with all visible water surfaces - natural water bodies, i.e. rivers, lakes, coastline as well as manmade water features, i.e. fountains, ponds, etc. Blue space is usually defined as an aquatic environment. The impact of blue settings includes the passive exposure – the view of water (e.g., changing colors, glistening of the sun on the water, etc.) and the sounds of water (e.g. braking waves, shimmering fountains) as well as active exposure - the touch of water (e.g. dipping fingers or feet or total immersion during swimming or bathing). The therapeutic dimensions of contact with water encompass many aspects, i.e. naturalistic (e.g. water), build (e.g. riparian constructions) and humanistic (e.g. sense of place) [16].

While it is not always possible to include natural water bodies within open public urban spaces, the substitute could be created with elements of open drainage systems. The SUDS - Sustainable Urban Drainage System can produce a dynamic waterscape that gets temporarily filled with stormwater after rain. The presence of water in SUDS depends upon natural cycles of rain. The SUDS provides a dynamic landscape feature when compared to manmade static urban elements, i.e. street furniture, pavement, and buildings. Rain gardens rely on plants and soil to retain and purify the stormwater. The interesting question could be thus the assessment of health-promoting qualities of SUDS, especially for passive exposure to blue settings.

IWA - International Water Association published seventeen principles for water-wise cities organized into four levels of action [17]. Level regenerative water systems include principles to replenish waterbodies and their ecosystems. Level water sensitive urban design encourages to enhance liveability with visible water. Level basin connected cities calls for a plan to secure water resources and mitigate drought. Level water-wise communities encourages empowering citizens. The sustainable management of rainwater in the form of rain gardens offers numerous benefits, not only ecological - according to IWA seventeen principles, but also for health promotion.

4. Rain gardens unite the blue and green

The major advantage of rain gardens is the possibility to offer contact with ‘green’ and ‘blue’ settings even in small-scale projects. Even a tiny rain garden in a planter facilitates easier contact with nature. Rain gardens can be regarded as a solution to the nature deficit in urbanized areas. The examples of good practices presented in this paper were selected to illustrate the possibilities of rain garden construction in various public spaces.
4.1 Gdynia, Poland
The rain garden constructed near InfoBox in Gdynia is a good example of the implementation of the city environmental policy on a small scale. The city is adopting to climate changes with many environmental programs. Rainwater harvesting and reusing are one of them.

4.1.1. InfoBox rain garden The Infobox was opened in 2013 to facilitate local cultural events. The rain garden was added in 2018. The first idea was to create a rain garden in a simple, basic planter. However, this simple idea grew into a more ambitious project after the cooperation of local artists, botanists, gardeners, officials, and businessmen. The concrete planters were shaped to include seating (Figure 1). This rain garden in a planter made the rear façade of the building more inviting. During the construction of the rain garden, the wall was decorated with a map of the city. The downspouts were designed to become focal points of the façade with their pronounced shapes and vivid color. The planting choice was crucial to guarantee self-maintenance. When inspected, one year after the installation, the plants were thriving and the rain garden soil was completely covered by lush vegetation. The aspect of adding the new interesting pocket garden to the city center was very important. This rain garden helped to create a friendly public space in the back yard of the Infobox building, and is visited by the employees, inhabitants and tourists.

![Figure 1. Rain garden in Gdynia one year after installation. Source: photo by author](image)

The most important objective of this investment was ecological education. The rain garden was created to demonstrate the ecological advantages of sustainable management of rainwater and green infrastructure. However, the aspect of health and wellbeing promotion was also important. The rain garden was designed by Ada Kulasek and constructed by local contractors and volunteers.

4.1.2. Rain garden in Gdynia Chylonia The total area of this rain garden, constructed in 2018, encompasses only 300m2. Its construction was part of the urban regeneration project implemented in the northern part of Gdynia.

This tiny rain garden proves that such an investment could make a huge difference in the quality of local living. A previously neglected space became lively and inviting. The central part of the rain garden was shaped into an urban plaza with places to sit and relax (Figure 2). It is used for organizing local events. The trees which were planted provide a valuable addition to the urban landscape. Even though the greenery will need some time to mature, the results of the urban intervention are already noticeable. The project resulted in a small pocket of public open green space which is occasionally filled with stormwater which is peacefully retained, filtered by plants and soil and infiltrated.

This rain garden has already passed the exam during heavy rainstorms. The adjacent properties which were previously suffering from flooding stayed intact. The local inhabitants during the interviews talked
about their satisfaction with this rain garden. Both the ecological, educational and social aspects are important in this garden. This rain garden was designed by Maciej Faust and Maja Markiewicz-Faust from MM Studio in Gdynia.

![Rain garden in Gdynia-Chylonia. Central plaza with seating. Source: photo by author](image1)

**Figure 2.** Rain garden in Gdynia-Chylonia. Central plaza with seating. Source: photo by author

4.2. Rue Soeur Valerie, Asnières sur Seine, France

In 2013, the town of Asnières decided to introduce the urban regeneration project for the street, Rue Soeur Valerie, to make it a pedestrian-friendly public space. The other aim, in accordance with the town environmental policy, was to promote sustainable management of stormwater. This street runs along the cemetery and is subject to intensive use as a parking space as well as a pedestrian path. It is a good example of how to create a friendly, walkable street using a sustainable water drainage system (Figure 3).

![Rain gardens in Rue Soeur Valerie. Source: photo by author](image2)

**Figure 3.** Rain gardens in Rue Soeur Valerie. Source: photo by author

The Rue Soeur Valerie in Asnières is only 191 m long and 8,30 m wide. The new design removed 12% of the impermeable surface to create a more inviting place for pedestrian walking. The rain garden system consists of bioswales and conveying bio channels filled with sand and drought-resistant plants that filter the pollutants. The total area of 178m2 of rain gardens has a stocking capacity of over 63m3 of water. The post-occupancy evaluation demonstrated good results. The ‘green’ and occasional ‘blue’ setting created a friendly space for effortless contact with urban nature.
5. Conclusions
The three presented examples demonstrate that even tiny spaces can be converted into places which not only form part of the green and blue infrastructure but also are important for human health and wellbeing. The SUDS – Sustainable Urban Drainage Systems apart from the obvious ecological role of integrating the rainwater into the waterscape of the local terrain offer the possibility for daily contact with nature in rain gardens. The sustainable rainwater management and local rain gardens could help to create everyday health-promoting places. Thus the rain gardens (SUDS) could be included in the blue settings category of health and wellbeing stimulating places.

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