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Rainwater Management in Compliance With Sustainable Design of Buildings

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Abstract

Continuous growth of population and consequent growing need for drinking water is a global problem. Effective use of rainwater for toilet flushing, laundry, gardening or washing thus saving about 50% of drink water. Overall, urban drainage presents a classic set of modern environmental challenges: the need for cost-effective and socially acceptable technical improvements in existing systems, the need for assessment of the impact of those systems, and the need to search for sustainable solutions. The paper describes comprehensive rainwater management approaches and contains an overview of the source control techniques as well as practical examples of rainwater use for non-potable purposes.

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1. Introduction

There are numerous techniques and approaches known around the world how to support sustainable rainwater management, especially in the urban areas, where the storm water can cause significant damages. The aim is to manage rainwater as close to source as possible which is also called source control covering number of measures. Rainwater harvesting as a part of the source control measures could contribute to the sustainability in rainwater management as well, by supporting potable water conservation and sustainability in water management in general. There are at least two very important facts, which need to be considered when dealing with the rainwater management. It is increasingly

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changing climate, resulting in short term but more intensive precipitation in one hand and increasing droughts in some countries in the other. The second fact is increasing urbanization over the last years, which has changed the natural water processes and increased the urban runoff significantly. These facts have influenced urban drainage and it is assumed that they will influence it even more in the future.

2. Rainwater – alternative water supply source for buildings

Effective use of rainwater from capturing rainwater for further reuse represents one of alternatives of saving so precious drinking water. Every building has potential to be used for capturing rainwater. Surface area or surface for capturing rainwater is determined by roof structure or other compact surface from which rainwater is drained by drainpipes into storage reservoir. The most common type of building used for capturing rainwater is family house. Theoretical yearly profit of rainwater depends on precipitation and roof area for rainwater capturing – Fig. 1. Rainwater is in our conditions - Slovakia used only as service water.

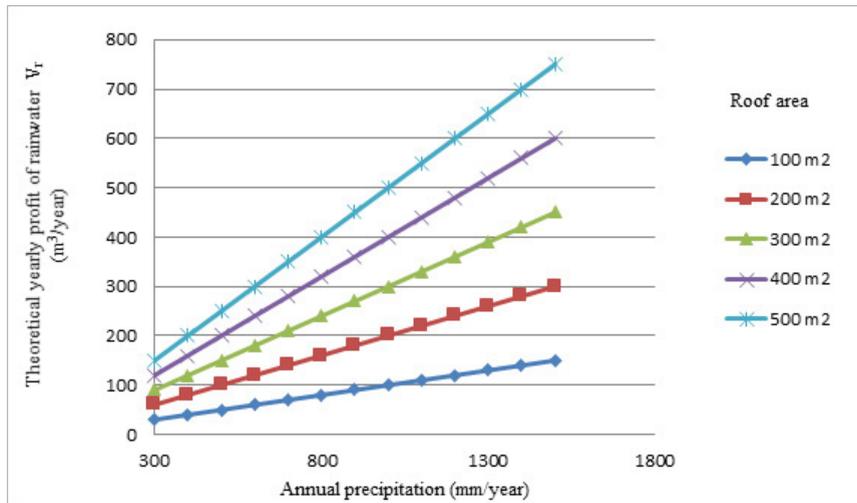


Fig. 1. Theoretical yearly profit of rainwater

Rainwater can be used as follows:

- flushing the toilet
- irrigation
- washing
- doing the laundry
- in some countries rainwater is considered to be used also as drinking water after necessary purification

The use of drinking water for flushing toilet represents 1/3 of overall average water consumption. This fact gives credit to reuse of rainwater mostly from the environmental point of view. Among other, reuse of rainwater minimizes the flow of rainwater to wastewater disposal system. Even though rooftop surface represents only a fragment of all urban surface area, drainage of rainwater from rooftops into storage reservoirs minimizes the flow of rainwater to waste-water disposal system and has positive impact on sewerage system.[2] [3].

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