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Major Factors to Consider for Long-term Storm Water Management in Cities

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Introduction

Land use changes associated to urbanisation include the removal of vegetation and the replacement of pervious areas with impervious surfaces, which result in changes in the surface runoff hydrograph as well as higher storm water runoff volumes and peak flows. Wastes and toxins from anthropogenic activity in cities end up on catchment surfaces, where they might be carried into water bodies during storms. Domestic and industrial wastewaters are also present. To ensure the operation of the created sites and public health, drainage systems must be established.

The Romans created drainage systems, some of which were rather complicated, and they existed even before that in Ancient Greece, Crete, and the Mesopotamian Empire. Urban outflows include storm water runoff, separate or combined sewage overflows, and snowmelt, and they are a major cause of pollution in receiving rivers in many countries. The quality and amount of storm water and sewage are vastly different. Heavy metals are most commonly found in storm water, whereas organic and nitrogenous pollution is more commonly found in wastewater. Storm water has lower levels of bacteria and nutrients than raw sanitary wastewater.

About the Study

Sanitary infrastructure is in varying phases of development in urbanised areas. This worldwide variety is demonstrated by the lack of studies on urban storm water in many Asian or African countries where people are still dealing with more fundamental concerns. Many older communities in Europe and the United States are served by combined sewage systems; in these cases, combined rainy weather flow discharges can cause serious damage to receiving rivers. On the other hand, it is widely known that the construction of separate sewage systems in the past was primarily motivated by economic reasons rather than differences in flow and quality. To summarise, numerous approaches to urban sanitation management have been utilised, including considering storm water as a quantity problem that must be addressed by releasing it directly into water bodies or processing part of it in wastewater treatment facilities. As a consequence, numerous options were investigated, including environmental considerations and adherence to more current statutory standards.

Storm water management might include strategic and political decisions, source control, and "end-of-pipe" solutions. In recent decades, source management has become more widespread than discharge into traditional mixed or separated sewage systems. These unique decentralised solution concepts are categorised based on their focus and the place where they were first created. Some of the most common terms in France include "Best Management Practices e BMPs," "Low Impact Development e LID," "Water Sensitive Urban Design e WSUD," "Sustainable Urban Drainage Systems e SUDS," "Innovative Storm Water Management" or "techniques alternatives." This publication uses the acronym BMP. BMPs can be structural, like rainwater collection systems, or non-structural, like pollution control and street cleaning. This approach to storm water management takes into account future needs as well as natural resource conservation. The impacts of storm water discharge into aquatic bodies are predicted to be dependent on the discharge characteristics as well as the volume and quality of the receiving water.

In metropolitan areas, higher discharge peaks and runoff volumes occur; these processes increase flow velocity, prompting streams to change their geomorphic characteristics. The impacts of storm water downstream of the discharge might be immediate or chronic, as well as direct or indirect. They may have an impact on the hydromorpho dynamics, quality, and aquatic ecosystem of the water body. At many decision levels, storm water management methods are necessary, but they all require knowledge and a clear understanding of the alternatives at risk, as well as the significant repercussions of each decision. A third method is modelling, although it requires input data. Literature or monitoring research can provide information about storm water qualities. A suitable method must include the costs of decisions made with limited data as well as the possibility for water management difficulties. Based on the authors' perspective and literature assessment, one of the purposes of this study is to give a comprehensive evaluation of the most significant information for sustainable storm water management [1-5].

Conclusion

Another project aim is to make data understandable and helpful to scientists, engineers, and decision-makers at all levels. Because research is always creating new results and various contexts, it was difficult to address all aspects. Emerging organic pollutants, for example, have recently been a source of concern in many countries, despite the fact that they are irrelevant in countries dealing with basic sanitation difficulties.

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