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A causal model to understand the impact of blue infrastructures on health and well-being

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Keywords

Causal model, health, well-being, blue infrastructures, urban water

Summary of key findings

- The model proposed leads to a new representation of the “Water component” in the city. It takes into account the diversity of waters (rain water, storm water, wastewater, urban river ...), the dynamics of water in the city (related to the water cycles) and the heterogeneity of territories in terms of water management.
- This model helps to understand the impacts (benefits/risks) of blue infrastructures and blue space on health and well-being.

Backgrounds and relevance

In the current scenario of global change (climate change and urbanization), the key issues for the water “in and for the city” are the secure supply of high water quality and the flood protection. But the development of concepts related to a sustainable city, water sensitive cities (Wong et Brown, 2009) or urban health planning (Roué Le Gall et al, 2014) leads progressively the authorities to consider the other dimensions (environmental, social and economic) of the urban water. In fact, urban municipalities are increasingly seeking for integrating alternative water management in order to recover rain water, to lower the urban heat island and flooding effects, to create or maintain wetlands, while protecting water resources...

Except the potential health impacts of storms and floods (Lane et al, 2013), the sanitary risks related to new practices and new uses of urban water (urban bathing for example) are not well identified. However, urban water begins to be recognized as an important component of healthy urban living (Van Dinther et al, 2016), both for physical and mental health (Foley et Kistemann, 2015; Völker and Kistemann, 2011, 2013, 2015; Coleman and Kearns, 2015), even if little attention is paid to measure happiness and quality of life in the cities (Science for Environment Policy, 2015). The objective of the paper is to present the construction of a causal model to understand the impact of blue infrastructures and blue spaces on health and well-being.

Material and Methods

The model is designed from the Swiss categorization tool inspired from the works of Nutbeam (2000) and Milvoy and Roué Le Gall (2015), coupled to the concept of the Millennium Ecosystem Assessment (ecosystem services and human well-being) (Pretty et al, 2011). The model is built from

data acquired on different districts of Rennes (France), with flooding area, storm water infrastructures, easy water accessibility for recreational purpose, etc..., completed by socio-economic and public health data of the population.

Results and Conclusions

The causal model proposed helps to understand the impact of blue infrastructures and blue spaces on health and well-being by:

- explaining the impacts (benefits and risks) of the blue spaces on the health determinants,
- identifying variables of vulnerability or resilience. These variables will help communities to plan strategies allowing to enhance benefits and minimize risks related to urban water (public policies, technical solutions, individual and collective behaviors...).

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