Water

A VITAL INGREDIENT IN LIVEABLE CITIES

Centre for Liveable Cities researcher **Lau Ying Shan** writes about the importance of water in urban environments, and why urban planners, like the best chefs, need to consider how they can push the boundaries to better integrate water and its related infrastructure into the heart of cities.

Urban planning and development is like cooking. For great food, skill is needed. Renowned chefs are able to use a combination of good ingredients, cooking temperature and time to produce delicious food. Similarly, good urban planners are able to create the right mixture of infrastructural and architectural elements to build a liveable city within geographical and socio-economic planning parameters.

It is without question that the quality of the ingredients is very important. Your chilli crab from a famous restaurant could be below par, just because the crab tasted stale. A good chef sources for the best ingredients. For this, the availability of a range of good ingredients in the market is essential.

Water – our drainage infrastructure, waterways, water bodies – is one such ingredient in urban planning. If used poorly, the urban landscape could be scarred with utilitarian-looking concrete channels. If used well, it has phenomenal potential in enhancing the cityscape. Water can help soften the city's appearance, cool the city, and provide nodes of habitat for urban biodiversity. Importantly, water connects emotionally with the people: peaceful waters bring calm, while choppy or rushing waters instil fear and anxiety.

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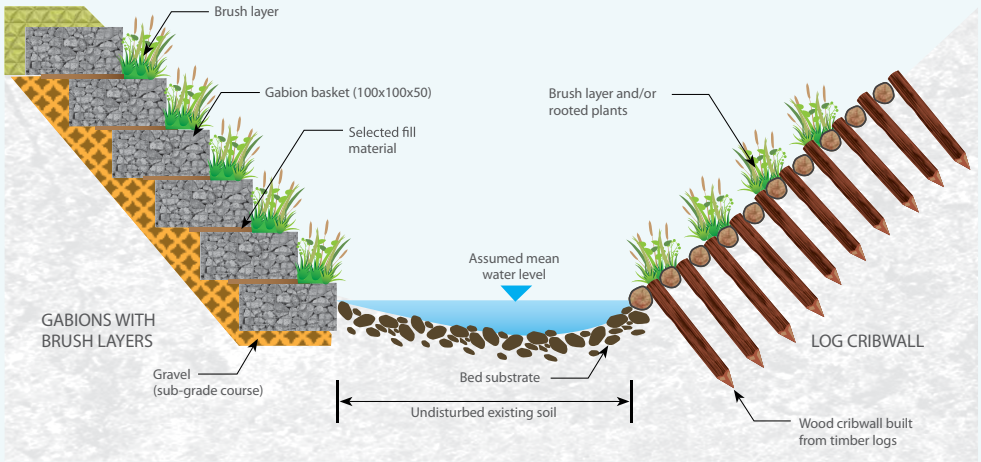

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01 Bioengineering techniques are applied to the banks of Kallang River at Bishan-Ang Mo Kio Park.

02 Cross-sectional diagram to illustrate how bioengineering techniques are applied.

03 The enhanced section of Alexandra Canal gives students an opportunity to be exposed to some aquatic flora and fauna.

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In Singapore, planners have recognised the role of water in enhancing the cityscape. In the 1990s, the Waterbodies Design Panel was set up to improve the aesthetics of our drainage infrastructure – a legacy of an era of rapid urban development – and the Active, Beautiful, Clean Waters (ABC Waters) programme in the 2000s sought to magnify the role of water in our lives, whether in recreational activities, relaxation or in building a relationship with water.

Just like chefs, urban planners will be able to push their boundaries if there is a larger market for them to source their ingredients from. Drainage infrastructure comes in a variety of forms: concrete drains can be U-shaped or trapezoidal; waterways can be constructed using a variety of methods such as gabion walls or bioengineering techniques; and ABC Waters design features can be employed for stormwater management. However, the supplier of the ingredients must be able to guarantee the quality of his products. Similarly, it is the role of the water or drainage agency, to ensure that their stormwater management solutions work.

Each solution is accompanied by a set of application caveats – for example, employing bioengineering techniques means increasing the roughness or resistance of the waterway with more bends in the waterway or reed beds. While this leads to better flood management and biodiversity and improves the aesthetics of the waterway, it requires a trade-off: more land compared to a straight concrete canal. Today PUB, Singapore's water agency, is carefully promoting a variety of stormwater management solutions in addition to conventional drains, such as detention tanks, bioretention ponds, and bioswales.

However, the relationship between the buyer and seller is reciprocal. If the supplier offers a wider range of ingredients, the chef has more to choose from. But if the chef requests for a certain type of ingredient, the supplier is inclined to meet the demand. It would be helpful if there is someone in a city's urban planning agency who is well versed in ideas at the forefront of drainage planning, and who then can provide the demand for the water or drainage agency to come up with innovative drainage solutions which not only meet the function of stormwater management, but which also help to enhance the city.

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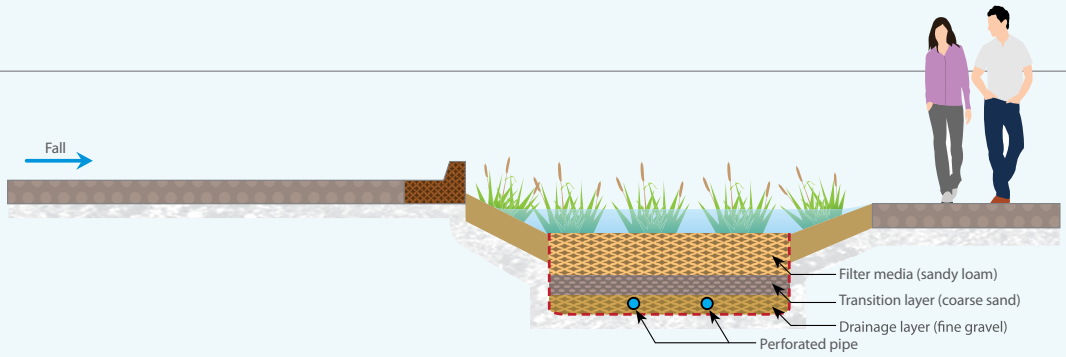
Furthermore, great cuisines have many flavours embedded, and these flavours are tasted sequentially: for example, sour, then spicy, then sweet. One way a good chef utilises his ingredients is to create a melody of flavours that tickles the taste buds over time. In a similar manner, the urban planner should also consider the fourth dimension – time – when thinking about infrastructure. In a tropical city like Singapore, this is particularly pertinent for drains and waterways that have the greatest utility during or just after a downpour, but are otherwise dry or low-value – a severe opportunity cost in the space-constrained

01 A map showing the extensive network of waterways and waterbodies in Singapore.

02 Typical cross-section of a bioretention swale (vegetated swale with bioretention systems location within the base to filter large sediments and fine particles, and to remove soluble nutrients)

03 A concrete drain has been transformed into a vegetated swale, channels rainwater into the nearby Sungei Ulu Pandan whilst removing large sediments from surface runoff.



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city-state. For example, we can have school fields that detain water when it rains (e.g., in Rotterdam), or pedestrian pavements that are designed to temporarily flood during a heavy rain.

In Singapore, such solutions in stormwater management require a deeper appreciation of the trade-offs. For example, just as how the taste of one ingredient might mask another, having floodable pavements might compromise pedestrian access, albeit during downpour. Just as how the chef plans his meals for different occasions or guests, it is up to the planner to evaluate these trade-offs for the most desired outcomes, in light of constraints of limited land space, a growing population and changing weather patterns.

A natural question might be: why give priority to water, when there are so many other "ingredients" to city planning to choose from? My reply would be twofold. The first is that water is a natural ingredient – there is no other ingredient in urban planning, except perhaps greenery, that can connect as

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01 Students learning about biodiversity at an ABC Waters site.

emotively with a city's residents. The second is: when you cook, do you cook with the most exotic ingredients, or do you try to make the most of what is commonly found? Singapore receives an abundant 2.4 metres of rainfall annually and has more than 8,000 kilometres of drains and waterways, so there is no reason to not capitalise on water as an environmental asset.

A skilful chef brings out the best in the ingredients to make the whole greater than the sum of its parts. Likewise, an adept urban planner is one who can create not just a functional city, but a city that supports nature and that tugs at the heartstrings of its residents. Harnessing the value of water is one way to do so.

Lau Ying Shan's interests are in the environment, and how people interact with natural environments. As a researcher at the Centre for Liveable Cities (CLC), on secondment from PUB, the national water agency, she looked into issues such as energy, environmental public health and cleanliness. Ms Lau gratefully acknowledges the inputs of CLC Executive Director Khoo Teng Chye, former PUB Senior Director Yap Kheng Guan, former Urban Redevelopment Authority (URA) Group Director Wong Kai Yeng, and PUB and URA colleagues. Their insights into the evolution of Singapore's drainage policies have helped inspire this essay.