ARC3 case study

Copenhagen Cloudburst Plan

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City: Copenhagen, Denmark
Population: 644,431 inhabitants (central city); 805,402 inhabitants (metro area)
Total surface area: 179.8 km^2
Koppen classification: Marine West Coast Climate
Elevation: 16 feet
Latitude: 55 38N
Longitude: 012 40E
HDI: 0.94
GDP: $442,052 million DKK ($60,386 million dollars)

Introduction

Cities today are facing a number of challenges: Growing population, social inequity, climate change – and one of the latest being the global pandemic, Covid-19. Copenhagen – the capital of Denmark is no exception. Even though Denmark in general has been able to manage the pandemic it has also led to significant changes in citizens' behaviour – and therefore an increased focus on how we plan in the city. Two hard lockdowns with closed shops, cafés, restaurants and bars led to an increased use of urban space in the city.

This case study will demonstrate how it is possible in the planning to alleviate one issue – climate change with its increased risk of flooding – following heavy rain, called cloudbursts, it is possible to also create opportunities that can be of use in other situations, in this case a pandemic. The case is the Cloudburst Management Plan of Copenhagen – and how this can be used to create a more equal and liveable city – also in times of a pandemic.

The Municipality of Copenhagen is committed to see the need for climate adaptation as an opportunity to make Copenhagen an even greener, more sustainable and robust city for the future everyday lives of the people living in Copenhagen (The Cloudburst Plan). To meet this goal, it is necessary to work with integrated city planning, where climate adaptation is one of many perspectives, when solving the challenge of uncontrolled flooding due to heavy rain/cloudbursts and more stormwater. The other perspectives that are needed for a successful project is improving the characteristic of the city, developing the uniqueness of the city, creating new green public spaces and improving flora and fauna, while strengthening the public life. This is the declared goal for The Municipality of Copenhagen: to make the public spaces better, also when it is not raining.

A brief history

The basic philosophy behind the Climate Adaptation Plan is to make adaptation a precondition in the future for urban development in the city. Resilience must be a part of all the work that will be undertaken – and not just from a negative, problem fixated point of view. The idea is to look for synergies and possibilities and develop solutions that will improve the recreative qualities of the city – and the quality of life for the Copenhageners.

Copenhagen started the implementation of its cloudburst management plan in 2015. The plan aims at securing the city from a 100-year-rain by creating a stormwater management system to supplement the existing sewer system. The plan covers the entire city – and the implementation period is estimated to be around 20 years. The planning was initiated in 2011 by the approval of the Climate Adaptation plan for Copenhagen – followed up by the Cloudburst Management Plan in 2012. This was further detailed in the next two years – leading up to a final implementation plan in 2015. After the approval construction started – but because of the dynamic nature of both urban development and climate change the plan has to be revisited on a regular basis. This is being done by smaller scale master plans with strong focus on urban space improvement potential and hydraulic measures and capacity.

The main approach of the plan is managing stormwater on the surface wherever possible – only using underground solutions where it is more economical – or the only possibility. This approach allows the city to use the climate adaptation measures to improve the urban landscape especially by adding more green to the city and upgrading urban space in the city.

A number of projects are currently being implemented, such as the Soul of Norrebro (see image 1). The selection of the locations has so far been to choose the more socially vulnerable parts of the city using the climate change adaptation projects as an opportunity to upgrade neighbourhoods that have previously been lacking attention and public investment.

Image 1. The Soul of Norrebro project for climate adaptation and cloudburst management
Source: https://stateofgreen.com/en/solutions/hans-tavsens-park-and-kors/

Governance structure of the implementation of the plan

The implementation of the cloudburst management plan is carried out in a close collaboration between the

city of Copenhagen and the publicly owned Utility – Greater Copenhagen Utility (shortened in Danish: HOFOR).

Responsibility for the plan lies within the Technical and Environmental Administration in the City Administration. They do the main part of the planning, design and construction. The utility only carries out work on underground solutions.

To facilitate the collaboration between the different stakeholders a joint organisation has been created where the daily collaboration is done between the utility and the city administration. For major decisions there is a joint steering committee that can decide on changes in the plan that have consequences that are affecting on a more general level.

The work is financed primarily through the water fees paid by the citizens and businesses in the city (based on their water consumption). Only where projects add more than hydraulic features (green spaces, playgrounds etc) it is paid by the city (taxes).

The projects aim not just to solve the issue of climate change (e.g. the hydrological or biological cycles of a project such as the Soul of Norrebro; see image 2). As already mentioned, it is important that they contribute to the positive development of the city.

To do this it is necessary to involve the surrounding stakeholders (the social cycle of projects' co-creation). When this is done, the local boards and citizens engage themselves in developing the city. The municipality shares its considerations about the project at an early state. This is an opportunity to both as they are challenged by outsiders view on priorities and considerations and the possibility for capacity building for the engaged people through a thorough dialogue. This dialogue often leads to new solutions, adjusted priorities, and even more know-how to the Copenhageners about developing the city with responsibility and to a diverse set of needs and goals. In the end, it is a political decision how the project will be developed. There are public meetings and in most cases at group of citizens and local stakeholders will be following the project closely – also getting involved in the tough decisions if budget cuts are needed.

The local engagement creates a sense of ownership to the projects that continues after the projects are finished. In many cases the citizens form local groups that look after the areas – or work on local activities – like markets, dancing and other activities. These activities create local more tightly knit communities – something that has also been important during the pandemic where the access to social activities were limited. But if you know people in your neighbourhood and meet them on a walk then it also creates some social cohesion and a feeling of belonging – and not being alone. In Copenhagen a growing number of households are single person households (more than a fourth of citizens in Copenhagen live in single person household) – and these were the most socially challenged during the pandemic.

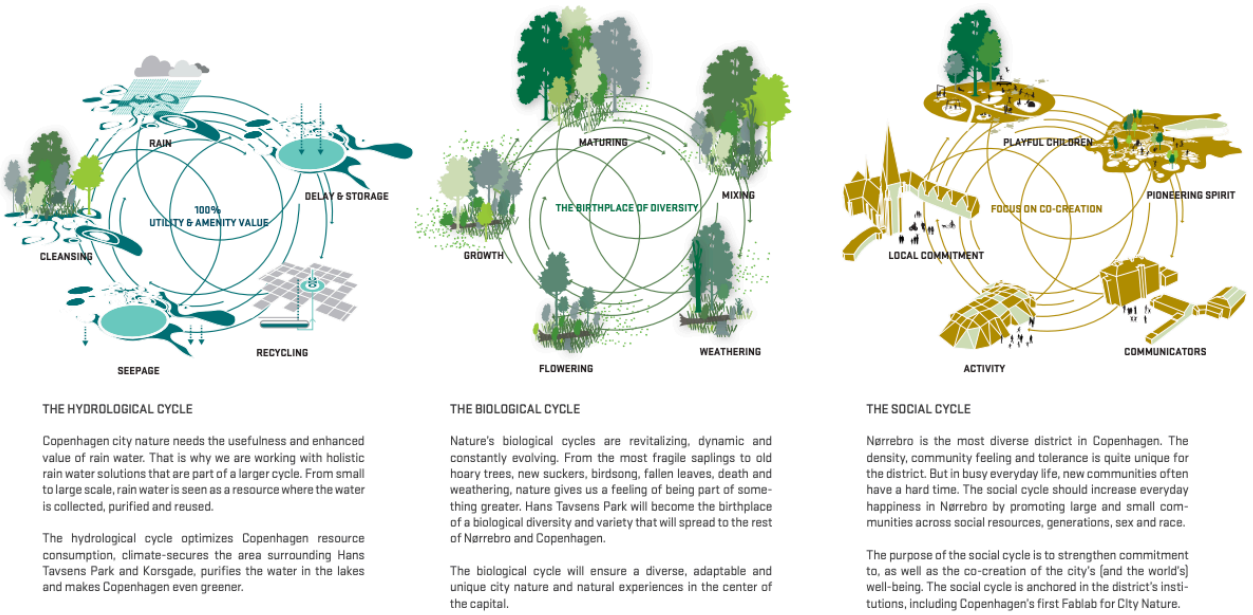

Image 2. Tactical approach: The Soul of Norrebro cycles
Source:
https://www.nordicinnovation.org/sites/default/files/inline-images/Soul%20of%20Norrebro_booklet.pdf

Analysis, Evaluation, and Implementation

From the beginning the concept of the cloudburst management plan was to focus strongly on the co-benefits of the adaptation process. It was important for the city that this should not be a technical fix – but also have a strong focus on the short-term benefits for the citizens. The city identified the following cobenefits:

- Increasing and improving recreative spaces in the city
- Meeting places – to also increase social resilience
- Increasing biodiversity in the city
- Health
- Improving micro-climate (UHI)
- Accessibility and safety
- Economic activity

At the time of the approval of the plan nobody had imagined that 5 years later Denmark would be facing an almost total lockdown with people working from home, and being advised not to have guests etc. With all indoor public places being closed the citizens turned to the outdoor open spaces. People would have walking groups, they would be biking, meeting on the harbour front to drink a cup of coffee. Suddenly there was a pressure on public spaces – and especially green spaces in the city. In some places the city introduced one way walking so that people could avoid close contact face to face or have other measures to avoid them being too crowded. And it became very clear that the city really needs more green space.

The cloudburst management plan delivers exactly that. By creating new green spaces – transforming hard paved surfaces to pocket parks with possibility for recreation, upgrading existing green spaces that makes

them more attractive for public use the cloudburst management plan increases the options for citizens to meet in a green space close to their home.

Future Implementation and Concluding Thoughts

The cloudburst management plan in Copenhagen has a long implementation period. For the next 20 years the projects will slowly but surely change the city. By creating new spaces for people to meet, by creating opportunities for physical activities, and by involving the citizens in the development of their city. At the same time the city will slowly become more resilient to future climate change – and hopefully also more resilient to future social challenges.