



afrialliance socialinnovation

AfriAlliance
MOOC#2
Final
Assignment

Title: Sponge Town for urban climate resilience,
Case of Kwa Vonza and Kajiado towns in Kenya

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DESCRIPTION AND BACKGROUND

According to the United Nations, in 2014, 54 per cent of the world's population lives in urban areas, a proportion that is expected to increase to 66 per cent by 2050. This growth is the result of major economic and social transformations. Coupled with extreme weather events and prolonged drought periods, water supply and provision especially in urban areas becomes more challenging. While natural resources are depleting, the pressure on these very resources increases. The problem we intend to solve therefore is insufficient urban water provision, stormwater and flooding and low quality of water. Cities are struggling to accommodate rapid urban migration and development is encroaching on flood-prone areas.

Urban green spaces are expected to play a key role in sponge city design and construction. However, considering their intended functions for ecology, recreation, emergency sheltering and others, the focus of the experts is to explore: (a) how urban green spaces help in collecting stormwater under the premise of guaranteeing their original role; (b) how much rainwater can be carried through the total rainwater volume without negatively influencing ecological and recreational functions and (c) what appropriate technologies can be applied (Science, 2019).

At the same time Kenya is facing some constraints to follow a linear growth path, which is inclusive and sustainable over time. When solely looking at population dynamics, Kenya is expected to become a predominantly urban country by 2033 with half of its population living in urban centres. Urban towns all over the country are growing and especially in Arid and Semi-Arid Lands (ASALs) and they are facing some pressing needs that are very common to booming African cities. Water supply in most of the cities in Kenya, more so the Arid and Semi-Arid (ASALs) areas, is heavily dependent on groundwater extraction where more than 87 per cent of the supplied water is being extracted from this source. Such extensive dependency enhances a very high depletion rate of groundwater table. Moreover, increased rate of urbanization, illegal occupation, and encroachment reduce the amount and volume of surface water bodies around the city that deteriorate the present situation. To solve these issues, government has taken a lot of initiatives but all of them are in vain because of unplanned activities. A new concept rather than that conventional concept should be considered to overcome the huge water problem. This concept is the Sponge city.

Abstract

Climate change is real, regardless of whether we agree on the cause. Forward-thinking urban regions are beginning to realize that the effects of climate change are going to be felt, at least to some extent, no matter what actions we take now. The future, if we plan to be there, must be sustainable. One of the most innovative trends in the industry is the sponge city concept. As the growth of urban population takes place at an exceptionally rapid rate, the city is unable to cope with changing situations due to their internal resource constraints and management limitations. In recent years Nairobi city, Nakuru, Naivasha, Kitui and Kajiado towns have been facing extensive water logging during the October to December rains as a common and regular problem of the city which corresponds to water pollution, traffic congestion, air and noise pollution, solid waste disposal etc. Another main water-related problem is the water scarcity during the dry season as a result of the continuous depletion rate of the groundwater table. The sponge city concept can help the city to overcome this situation from a better aspect. The progress in sustainable urban water management is also impacted by innovations in technologies as well as in management strategies. These technological innovations create fertile ground for businesses to adapt state-of-the-art developments from around the world and contextualize them into fit-for-purpose products.

In 2014, the People's Republic of China established the concept of Sponge City, which was used to tackle urban surface-water flooding and related urban water management issues, such as purification of urban runoff, attenuation of peak run-off and water conservation. The concept is being developed to make use of blue and green spaces in the urban environment for storm (Khan & Afroz, 2018).

Pressing needs in Kenya ASALs towns include equitable and efficient water use in urban and peri-urban agriculture, reliable water harvesting and storage, preventing and coping with floods, droughts and improving urban planning. These needs are specifically targeted through the concept of sponge cities that can be used innovatively to solve this challenges (Guideline, n.d.).

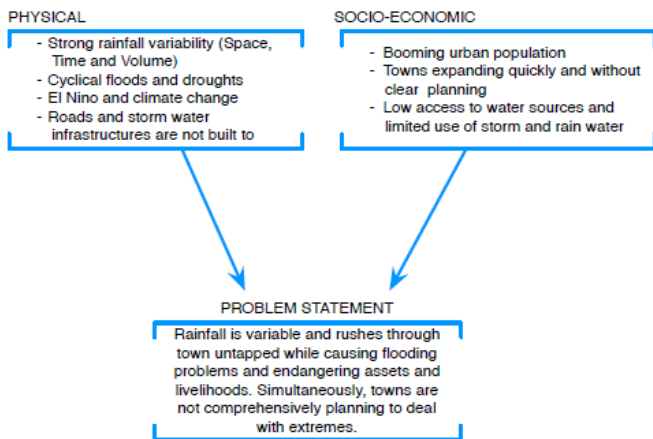


Figure 2: Some of the challenged experienced in the urban areas case of Kajiado and Kwa vonza in Kenya

Figure 1: Physical and Socio-Economic challenges in relation to the growing towns



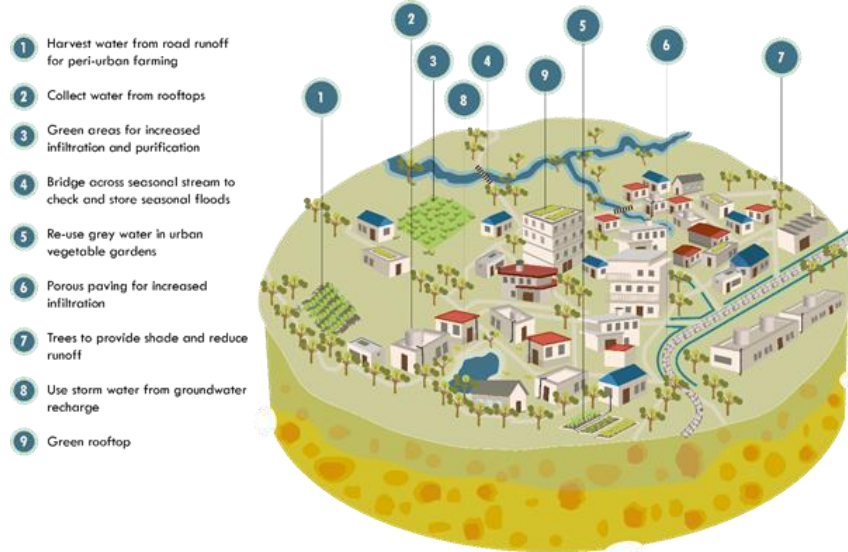
A sponge city is a city that is designed to passively absorb, clean and use rainfall in an ecologically friendly way that reduces dangerous and polluted runoff. Associated techniques include permeable roads, rooftop gardens, rainwater harvesting (both run off and roof water, kitchen gardens, hydroponics, biological

wastewater purification, wastewater reuse, green space and blue space such as ponds and lakes (Khan & Afroz, 2018). Sponge City combines storm water management dealing with excess water, with methods to retain, recharge and re-use water for periods of drought. This approach seems simple, but in practice it certainly is not. Especially not in an urban environment, where the concrete, stones and asphalt are prohibiting water to flow naturally into the ground and sustain the resource (Iuwieke Bosma, 2019).

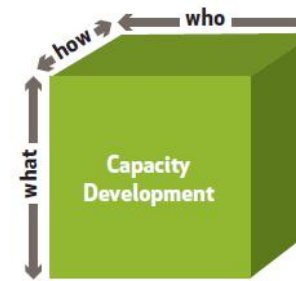


TECHNOLOGICAL SOLUTIONS

Technical solutions may be those related to delivering services to most vulnerable children, managing an ecosystem, developing small and medium sized enterprises, etc. The core of the project is the technical enabling of urban retention and recharge. The technical water 3R interventions will comprise of the following, but will certainly not be limited to (Guideline, n.d.):



CAPACITY DEVELOPMENT



Capacity development is a continuous process that fosters the abilities and agency of individuals, institutions and communities to overcome challenges and contribute towards local solutions in health, livelihoods and natural resources management (Pact, 1828). Though often developed in response to an immediate and specific issue, capacities are adaptable to future opportunities and challenges. The right combination of interventions tailored to any given context will lead to local actors (1) overcoming challenges and (2) contributing towards local solutions.

Capacity development framework describes the range of actors we engage with for capacity development support, or “whose capacity is being developed?”

- Individuals such as civil society leaders/organisations, youth activists, change agents
- Professionals.
- Organizations include for-profit businesses and government departments.
- Networks include civil society networks, coordinating bodies at the local or national level,
- business coalitions and communities of practice.

All in all, the project envisages a holistic approach, combining different aspects of sustainability. The idea also has a great potential for local investors such as the water vendors, water tank suppliers and urban farming.

GOVERNANCE STRUCTURES

KNOWLEDGE-BASED SMART AND SUSTAINABLE CITY



Good urban governance is a multidimensional concept that focuses on the improvement of the quality of living conditions of local citizens, especially those of marginalized and disadvantaged communities. Cities face various adversities and challenges such as unsustainable use of natural resources, lack of housing and infrastructure, the prevalence of poverty, rapid urbanization, crime, disasters and effects of climate change. City resilience is an inclusive process that refers to a city’s ability to sustainably manage unexpected and expected risk-related events. In addition, it includes a city’s capacity to adapt to future challenges from a strategic and spatial perspective.

Within this context, urban governance is confronted with complex issues such as waste disposal, housing, low tax bases, unemployment, sanitation and water purification, electricity, the construction and maintenance of roads and other challenges associated with rapid urbanization (Meyer, 2019). In general, sustainable development interventions are implemented via these service delivery programs. As such, citizen dissatisfaction is mostly experienced at this level of governance. Local governments in general are responsible to foster sustainable livelihoods and to ensure urban centres resilience. Good urban governance can be regarded as a prerequisite for growth and prosperity in communities. Sponge town development brings on board all the players in a town. They include but not limited to county government, a civil society organization or a non-governmental organization, an enterprise or an individual who deals with water management, greening, urban development and/or spatial planning.

Hence, in this regard the focus of urban governance is on the facilitation of access to human, financial, natural, social and physical assets as key components of community’s sustainable livelihoods in terms of the following key issues of urban governance:

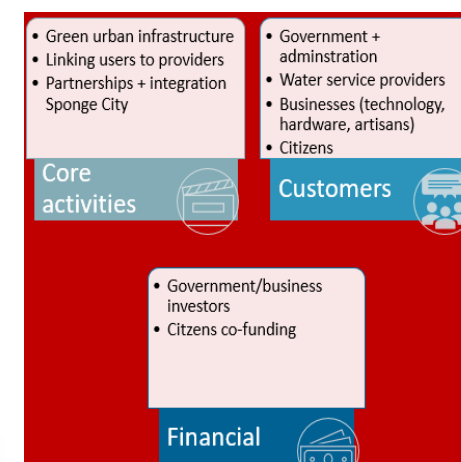
- Political considerations (e.g legitimacy, policymaking, public support);
- Technical capacity issues (e.g service delivery, use of SMART technologies);
- Administrative arrangements (e.g organizational structures, control mechanisms to curb maladministration and corruption; processes, procedures, methods);
- Environmental context (e.g reduce negative impact through waste management and misuse of natural resources, neighborhood resilience) and
- Social concerns and community engagement aspects (e.g promoting local democracy, fairness in the distribution of benefits, services and products, crime prevention).

SOCIAL INNOVATION

BUSINESS ROAD MAP

In principle the business model from Sponge City is based upon investment in low-cost technologies and local business solutions. Investment can be done by governments, citizens and civil society organisations. Special attention is given to new business ventures for local entrepreneurs. Innovative business will get a large customer base in Sponge City through active linkage on the community platforms.

Citizens will invest in low-cost water technologies in their own households, because they can earn back their investment through improved and reliable water supply, at a lower cost. This can for instance happen with self-supply systems and urban farming, but also when citizens would strike a deal with water service providers for adding surplus water to the system through their harvesting systems. It is likely for especially women-led and poor households to venture into local business opportunities of selling water and vegetables, produced in their urban farms.



Governments will invest in Sponge City implementation as it will overall be cheap and it adds to greening the city with improved water management. There are severe challenges with water provision and allocation in developing towns. Leveraging and co-investment by business and citizens is expected to render higher success.

- Businesses to create revenue from their innovative and bio-friendly technologies. Can be a range from hydroponics, to eco-tiles, to smart water monitors and more.
- Citizens are interested to invest, as it will result into savings in the long term
- Government to invest in the technologies to effectively and sustainably solve water supply issues
- The sponge team exhibits all the skills and expertise on urban planning, water provision, water resource management, green infrastructure and community mobilization and training. This team offers its consultancy and broker services to the government, business and citizens.

Sponge City combines storm water management dealing with excess water, with methods to retain, recharge and re-use water for periods of drought. This approach seems simple, but in practice it certainly is not. Especially in an urban environment, where the concrete, stones and asphalt are prohibiting water to flow naturally into the ground and sustain the resource.

In contrast to the current approach where storm water is drained out of the system as quick as possible, this innovation focuses on infiltration and storage, in which water harvesting also takes part. This approach has the objective to recharge groundwater/surface storage in order to improve water quantity and quality for domestic and agricultural (urban farming) use.

Sponge City involves a wide range of innovative technology added through diverse businesses. For example: hydroponics, biological wastewater purification and eco tiles. Additionally, it can tap into a rich toolkit of urban planning. For instance: community mapping, participatory planning and place-making and scenario planning. There will be a greater focus on developing a platform for government authorities, citizens and private sector all together. Additionally, it will explore to mainstream successful approaches into public investment programs and business opportunities for local water professionals

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