

Urban climate resilience: European-African knowledge exchange toolbox

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Abstract

There is a clear demand for collaborative, knowledge sharing tools for urban resilience projects. Climate-scan is an interactive, web-based map application for international knowledge exchange on 'blue-green' projects around the globe. The tool was applied during the Adaptation Futures & The Water Institute of Southern Africa (WISA) conferences, June 2018, in Cape Town. The use of climatescan by different stakeholders during the event led to recommendations for a better application of the web-based map in Africa and around the world.

Keywords: *Urban resilience, Open source, Toolbox, Knowledge Exchange*

Introduction

There is a wide diversity of projects undertaken to address urban resilience and climate proofing in the world. International interactive open source tools are used as communication aids to promote engagement with stakeholders in the field of climate change and related environmental issues (Hall 2001, Hamill, et al., 2013, Tipping et al., 2015).

Climate-scan is an optimised interactive online map application that provides an easy-to-access database of international project information in the field of urban resilience and climate adaptation – or 'blue-green' projects - around the globe. The tool is able to support the tasks of prioritising risks, evaluating flood models, designing appropriate remedial measures and map several sustainable urban drainage systems. During an international knowledge exchange mission⁴ from The Netherlands to Cape Town and Durban in November 2017, the need for international knowledge exchanges of Best Management Practices (BMPs) was highly recommended. Climate-scan has proven to be a successful tool with over 10,000 users and more than 3,000 international projects (mostly European). The tool is used in city climate scans

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around the world (Heikoop et al., 2018) and several international projects and workshops, such as Innovations for eXtreme Climatic Events (INXCES) and Water Co-Governance (WaterCoG⁵), and serves the needs of different stakeholders (Boogaard, et al., 2017).

The open source webtool (www.climatescan.nl) was applied during the Adaptation Futures & The Water Institute of Southern Africa (WISA) conferences, both held in June 2018 in Cape Town.

Methodology

Engagement with stakeholders through workshops and semi-structured interviews within EU projects, such as INXCES and WaterCoG, resulted in evaluating Climate-scan in order to judge the need and potential for implementation of tools such as Climate-scan in Africa. The objective of this study is to implement and evaluate www.climatescan.nl, which is currently primarily used in Europe and Asia, in a South African context. The evaluation was undertaken via semi-structured interviews during workshops with experts (lecturers, academics) and young professionals that took place during a 'toolshed' workshop at the Adaptation Futures conference, and as a case study in the Wetskills Water Challenge during the WISA conference. The Wetskills Water Challenge is a pressure-cooker programme for young students and young professionals with a passion for water from all over the world. Climate-scan and Wetskills is a new way of authentic learning for young professionals with a passion for water. The Challenges take place worldwide during international water-related events. In mixed teams, the international participants work on transdisciplinary issues with both non-government and governmental organisations. They met before and during WISA, and worked on water-related topics such as the Climate-scan case.

Implementation in Africa

Previous studies indicated that stakeholders are in need of tools that are interactive, open source and provide more detailed information on climate adaptation projects (location, free photo and film material) (Boogaard et al., 2017). The first African projects were uploaded on Climate-scan during the conferences in June 2018. For example, several participants at WISA downloaded the app and uploaded stormwater Best Management Practices (BMPs) - techniques, measures or structural controls used to manage and reduce the rate and quantity of surface water runoff from developed areas and to improve runoff water quality. Good examples of sustainable urban drainage systems in South Africa are, in most cases, implemented either in gated communities or office parks, or in areas that are (for safety

⁵ <https://inxc.es> and <http://www.northsearegion.eu/watercog/>, consulted 8 September 2018






reasons) not easily accessible. The google view and the GPS function of Climate-scan project listings is thus a great advantage of the app. **Figure 1** shows an example of an project uploaded by Aqualinks in Johannesburg, South Africa.



Figure 1. An example of an uploaded project during the respective Adaptation Futures and WISA Wetskills conferences. Here a stormwater retention area functions as a bioswale, and contributes to the Green Infrastructure Strategy of the City of Johannesburg (Source: <https://www.climatescan.nl/projects>)

Users of Climate-scan can create their own climate adaptation categories and upload projects. The most uploaded projects within categories of different types of measures are listed in **Table 1**.

Table 1. Top 10 project-type uploads by category (Source: Susdrain¹ and Climate-scan)

Category		
1. Swale	A shallow vegetated channel designed to conduct and retain water, but may also permit infiltration. The vegetation filters particulate matter.	
2. Constructed wetland	Wetland: flooded area in which the water is shallow enough to enable the growth of bottom-rooted plants. Wetlands are constructed in urban area to store water after stormwater events and improve water quality.	
3. Waterharmonica	Ecological engineering (constructed wetland) treating waste water into usable surface water. The Waterharmonica focuses on integrated ecological engineering processes, by optimising multi-functional constructed wetland processes.	
4. Green roofs (and walls)	A roof with plants growing on its surface, which contributes to local biodiversity. The vegetated surface provides a degree of retention, attenuation and treatment of rainwater, and promotes evapotranspiration. Sometimes referred to as an alternative roof.	
5. Floating urbanisation	Floating or amphibious constructions as floating homes will adapt to variation of waterlevels (flooding, drought). Floating homes are constructed around the world to adapt to climate adaptation.	

¹ <https://www.susdrain.org/resources/glossary.html>, consulted 8 September 2018

<p>6. Permeable pavement</p>	<p>A permeable surface that is paved and drains through voids between solid parts of the pavement. A permeable is a surface that is formed of material that is itself impervious to water but, by virtue of voids formed through the surface, allows infiltration of water to the sub-base through the pattern of voids, for example concrete block paving.</p>	
<p>7. Opportunities for adaptation</p>	<p>This category shows locations that provide opportunities for climate adaptation. Uploaded projects are implementation of nature based solutions or locations that are suited for urban resilience</p>	
<p>8. Hollow gully free roads</p>	<p>Roads that are constructed as drainage. An example is a surface flood pathway: routes in which exceedance waterflows are conveyed on the ground.</p>	
<p>9. Sub-surface infiltration</p>	<p>A sub-surface structure into which surface water is conveyed, designed to promote infiltration.</p>	
<p>10. Heat stress measures</p>	<p>An upcoming category linked to implementation of green and blue measures in previous categories (swales, green roofs and walls, permeable pavement, raingardens etc.)</p>	

The participants of the workshop at Adaptation Futures gave positive feedback on the free and open access usage of Climate-scan and the number of projects uploaded (over 2000 projects in 2 years). However, this ‘learning-by-doing’ concept also raised legitimate questions of ownership, quality control, maintenance, business model design and sustainability. Most users wanted to incorporate and engage with such development issues within a more interactive platform that includes stakeholders. Climate-scan was also used during the Wetskills case study at the WISA conference (**Image 1**).



Image 1. Minister Gugile Nkwinti of Water and Sanitation of South Africa and Wetskills participants that used Climate-scan during the Wetskills challenge (Source: Dutch water sector, 2018).

Conclusion

The website www.climatescan.nl was particularly appreciated by postgraduate students, lecturers and researchers. The webtool has been used during workshops in South Africa and the outcomes of this project have shown there is a clear demand for a collaborative, knowledge sharing tool where first impressions of different urban resilience projects can be quickly gained. The semi-structured interviews during (and outside of) the South Africa workshops yielded positive feedback on the free and open access usage. The challenge for Climate-scan will be changing the free ‘learning-by-doing’ concept to a platform with more interaction with stakeholders and clear strategy on ownership, quality control, maintenance, business-model design and sustainability. It is hoped that the new Climate-scan uploads will stimulate international knowledge exchange on wicked problems such as drought, heatstress and floodings, while clear recommendations for a better application of the web-based map in South Africa, and beyond, provide guidance on how the tool can best be used in the field of adaptation policy and practice.

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