Result

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Entire cities could benefit from green roofs

Heleen Mees is investigating how five metropolises are greenifying their roofs

Rotterdam is making good progress with its creation of green roofs. Heleen Mees, researcher at Utrecht University, drew this conclusion from her research, in which she compared the green roof policy of four different cities with that of Rotterdam. Rotterdam awards grants to those wishing to create a green roof, thereby helping to promote the general acceptance of green roofs in the city. However, the researcher thinks this policy should be followed up: "You can't award grants forever."

In the Netherlands, Rotterdam is in the lead as far as the creation of green roofs on new and existing buildings is concerned. "The municipality has placed green roofs on its agenda, and has developed a grant policy because it recognises the great importance of green roofs," says Heleen Mees, who will obtain her doctorate this year from Utrecht University for her research.

Heleen Mees compared Rotterdam's policy with those of other cities in the Western world striving to increase the number of green roofs. Basel and Stuttgart are the front-runners in respectively Switzerland and Germany. London is the front-runner in the United Kingdom, and Chicago in the United States. When Rotterdam's findings are compared with those of other cities, significant differences appear. Rotterdam actually did not develop its policy on green roofs until very recently; the municipality has been active in this area only since 2008. Cities like Basel and Stuttgart have been active for a much longer period of time: Basel since 1996 and Stuttgart even before that, since 1986. This policy has also been on the agendas of Chicago (2003) and London (2004) for a longer time than Rotterdam.

Less expensive

Basel and Stuttgart also differ from Rotterdam in terms of their approach. As far as new construction or renovation work is concerned, the creation of a green roof is obligatory in both cities. Heleen Mees: "Basel started with a policy similar to that of Rotterdam's; grants were awarded for the creation of green roofs. However, this became obligatory from 2003 onwards. That is also how it started in Stuttgart. Despite the grant, it is still relatively expensive to create a green roof in Rotterdam. It is much cheaper in Basel and Stuttgart. By making it obligatory, a market was created for

these roofs. Because businesses compete with each other, the prices dropped. As a result, the costs of green roofs are not that prohibitive in Basel and Stuttgart. Although people no longer receive any grants, they do benefit from a tax benefit if they have a green roof."

The policy in Stuttgart and Basel has resulted in an enormous increase in the number of green roofs. More than one million square metres of green roof surface area is now to be found in both cities. In Basel, a quarter of all roofs have now been greenified. In comparison: in Rotterdam, hardly one per cent of the roofs are green. "It was a deliberate policy in Basel: people were first prepared mentally to see the beauty of green roofs. And as a result of this awareness, making green roofs obligatory was a logical next step."

Taboo

That is how things should be approached in Rotterdam, considering the significant additional water storage problem due to climate change, reflects Heleen Mees. However, making something obligatory is likely to be considered taboo in the Netherlands. So how should we go about it? "Rotterdam should explore the possibility of cooperating with the major players (e.g. housing associations)", says Mees. "It should then be possible to obtain benefits in the city's predominantly paved areas. I think it should be possible to make agreements.

Alexandrium: Europe's largest green renovation roof

A few years ago, when the roof of Alexandrium Shopping Centre was due for replacement, the key question facing Corio, the owner, was: "Should we again cover the roof with gravel, the way it was, or can we go about this in a more sustainable manner?" We finally opted for the latter. Guillaume Kriek, Facility Manager of the Alexandrium Shopping Centre on behalf of Corio: "The creation of a green roof fits in perfectly with our company's sustainability philosophy. We started on the renovation in 2011 and completed the work towards the end of 2013."

It was quite a job. "Every roof had to be cleared, the gravel was vacuumed up, shopkeepers' equipment that had been installed on the roof, especially for air-conditioning, had to be disconnected and reconnected at a later stage", said Guillaume Kriek. The immense shopping centre has several roof levels, which were worked on one by one. They were again bituminized, but were then not covered with gravel but with sedums.

Neighbours who look out onto the roof now have a view of no less than 22,000 square metres of greenery, in varying shades. The sods of sedum were carefully rolled out over the new roofs. Because some sedums flourish better on one part of a roof than on another, in time colour differences arise, further enhancing the view.

The shopping centre's green roof, Europe's largest green renovation roof, was realised in cooperation with the shopkeepers, local residents, the City of Rotterdam, the Prins Alexander submunicipality and the Schieland and the Krimpenerwaard District Water Board. The latter three parties awarded a grant for the extensive project.

Guillaume Kriek expects that a green roof will have only benefits: "When it rains very heavily, the roof can store 730,000 litres of water, and can therefore also serve as a water storage reservoir. The roof absorbs more particulate matter and muffles ambient sounds. Shopkeepers will see the new roof reflected in their energy bills, since a green roof exposed to the sun is up to 35 per cent cooler than a gravel roof. Air-conditioning units, therefore, do not have to operate at full capacity. Local residents briefly experienced discomfort from the work, but they were then rewarded with a much better view. We also benefit: the life of a green roof exceeds that of a traditional roof by 15 years."

Although a terrace has not yet been realised on the green roof, shoppers can experience a tangible result: the roof now has its own bee population, which produces a large amount of honey. Alexandrium honey was put on sale in the shopping centre this year for the first time.

Green roofs in Rotterdam enter new phase

Rotterdam is trying to promote the creation of green roofs in several ways. One of these is the grant scheme, which makes it financially very attractive to create a green roof. Whenever possible, green roofs will be realised on municipal properties. The creation of green roofs on the properties of third parties, such as housing associations and businesses, is also encouraged. "The grant scheme has been a great success over the past few years. Approximately 150,000 m² of green roofing has now been realised," says Paul van Roosmalen, Green Roofs Programme Manager with the City of Rotterdam. "The grant scheme will expire towards the end of 2014. In the coming years, we will promote and facilitate the creation of green roofs in other ways. In addition we will consider the results that have already been achieved in Rotterdam and the effects of measures taken in other cities. I expect that an increasing number of Rotterdam residents will see the benefits of green roofs and that the green roof surface area will also increase further without a grant scheme."

Paul van Roosmalen
since he graduated from TU Eindhoven, has worked for the City of Rotterdam as a project manager for architectural projects, with a brief stint as an English teacher in Ecuador. He is also currently the programme manager for green roofs with the City of Rotterdam.

with housing associations to deal with problem areas in terms of climate adaptation." With these major players (e.g. housing associations) in particular, it should be possible to increase the number of green roofs quickly and significantly. "You will then be able to make some real progress," says Heleen Mees. "This also applies to agreements with the owners of shopping centres, which often have flat roofs that can be used for a variety of purposes. Although a number of them are already green, this number can be further increased. Things could then suddenly take off."

The policy which Chicago is pursuing differs in other respects. Although green roofs are not obligatory here, those who submit a planning application for a building with a green roof do not have to wait as long for their planning permission as those who submit a planning application for a building without such a roof. London's regulations are the least ambitious; a builder only has to explain why he has not included a green roof in his plan. How this regulation is implemented differs in each of the city's 33 boroughs.

The birds and the bees

In the Netherlands, Rotterdam was the first to develop a policy on green roofs. The grants are very generous; there is a very large budget for this. "Rotterdam's water storage problem is huge," Heleen Mees explains. "Green roofs can play a major role here." As her research progressed, Heleen Mees became increasingly convinced of the necessity of green roofs. "Green roofs have a cooling effect in the summer and add a friendly touch to the city: it is nicer to look out onto greenery than onto a wide expanse of asphalt. Moreover, they benefit the city's natural world: the birds and the bees. The roofs of new buildings could be made accessible so that they can serve as gardens and public green spaces."

It would be even better if the green roofs could be combined with other sustainable priorities, such as installing solar collectors and further provisions for water storage and heat stress prevention. Heleen Mees: "Basel has already made much progress developing the right combination of solar panels and green roofs and developing seeds that germinate on a roof and then create their own ecosystem. Smart innovations such as these come about thanks to the various active market players."

Heleen Mees
researcher at Utrecht University, is due to receive her doctorate at the end of 2014 on the subject of division of responsibilities between the public and private players to make cities climate-proof. Prior to that, Heleen worked as an international marketeer in the corporate sector for 15 years and has been a Knowledge for Climate participant.