

Meadow flowers on the roof even attract butterflies to the loft balcony, brightening up the breakfast table. What a brilliant sea of colour! But green roofs do more than just please the senses: they help combat and adapt to climate change.

The torrential downpours that have become increasingly common due to climate change raise the risk for dangerous flooding in cities. Sewerage systems are simply not up to the task. "Green-roof plants and their grow-

ing media – such as crushed lava – are efficient water-retaining agents. They differ completely from standard roofs, which spew out the rainfall via drainpipes straight into the streets or sewers," explains Marja Mesimäki, an environmental sociologist employed by the University of Helsinki Botanic Garden.

During summer heat spells, metropolises suffer from heat pockets. Cities absorb heat, making them more uncomfortable than sparsely populated areas or the countryside. Climate change continues to exac-

erbate the phenomenon, which in turn increases the need for cooling. This results in a vicious circle, with energy consumption on the rise and carbon dioxide emissions skyrocketing. "Rooftop plants evaporate water, and the evaporation process cools the air. Green roofs lower indoor temperatures with smaller emissions than air conditioning and other equipment."

Japanese cities, for example, make active use of green walls, but live construction elements also give rise to reservations and

misconceptions. Many assume that green roofs are flat structures with mounds of soil on top. Thus, the reasoning goes, humidity brews in the roofs, water pushes through the structures and moisture damage ruins the whole building.

"In reality, roofs tend to be made of light and water-absorbing materials instead of soil. They must also have a minimum inclination of a few degrees to ensure that water does not remain standing," says Mesimäki. "The plant layer is isolated using a root bar-

rier, filter membrane and underdrainage."

This all makes sense but is also somewhat more expensive than standard construction. On the other hand, diminished energy expenses save money. Green roofs are also durable. "Since ultraviolet radiation and temperature changes do not embrittle the roof, its life cycle may double or triple that of a normal one."

In the *Green roofs in urban areas* project, part of the World Design Capital 2012 programme, researchers from two units of the

university – the urban ecology research group and Mesimäki's colleagues from the garden lead by the Finnish Museum of Natural History – collaborate to seek optimal roof solutions. The criteria include both environmental and user friendliness. "We are researchers, not a PR agency for green roofs", Mesimäki points out. "Poor design can result in green roofs that are harmful to the environment. Alien, non-indigenous species may escape from them or nutrients might run off from over-fertilised roofs, leading to eutrophication." ●



IT'S COOL – IT'S FLORAL Antti Kivimäki

Green roofs are... simply wonderful. Not only that, but they also cool houses, retain water and purify the air.



Green roof researchers also inventory species independently spread on the top of Helsinki.