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Rooftop Gardens Reduce Smog, Improve Water Quality and More!

When you think about it, there is very little land in a city that is not paved. Over 75 percent of most cities are covered with buildings, sidewalks and parking lots. All that pavement has turned many cities into smog-filled heat islands that channel millions of gallons of polluted water into rivers and lakes.

Urban residents across the world are starting to look up, and turn a plentiful resource into a solution: green roofs. A green roof is a roof that is also a garden, from a simple container garden to a roof covered with several inches of soil (on top of a waterproof barrier) and a meadow.

Green roofs help moderate temperatures, improve air quality, reduce storm-water runoff and create habitat for birds and butterflies. They also create a garden refuge in a sea of concrete.

Container and rooftop gardening is an exciting trend in the United States. Now more elaborate green roofs, called "extensive green roofs," are catching on too. In Chicago, a citywide program is helping businesses and homeowners to plant gardens on their roofs through tax incentives and technical help. Portland, Seattle and the state of Maryland also offer tax incentives for creating green roofs.

Here are four ways that turning your roof into a garden can help improve the environment:

1. LOWER TEMPERATURES AND REDUCE SMOG IN THE SUMMER --->

A "heat island" is created when a city's asphalt, buildings and rooftops absorb heat from the sun and then release the energy at night. That can make a city 6 to 8 degrees hotter than in the surrounding rural areas. In fact, when air temperatures reach 95 degrees F or higher during the summer, roof surface temperatures can reach 175 degrees F. When the temperature is hotter, people use more air conditioning, electric plants must work harder and thus more pollution is created. Pollution, in turn, reacts with heat and sunlight to form smog. Plants, however, transform heat and soil moisture



into humidity through evapotranspiration, thereby cooling the air. So, if you increase the number of green plants in a city, the temperature will actually fall. According to an EPA computer simulation, increasing greenspace in Los Angeles by 5 percent could lower summer temperatures by 4 degrees. Those lower temperatures would decrease smog by 10 percent and save \$175 million in energy costs.

2. **INSULATE IN THE WINTER** --->

Not only do they lower temperatures in the summer, green roofs also insulate in the winter. On average, extensive green roofs provide 25% more insulation than a regular roof. And heat loss due to wind can be reduced by 50%.

3. **IMPROVE WATER RUNOFF** --->

When rain falls on a forest or meadow, the water goes through its natural cycle. About 30% of the water reaches shallow aquifers that feed plants, another 30 percent percolates into deeper aquifers and approximately 40 percent is almost immediately returned into the atmosphere through evaporation and plant transpiration. There is virtually no surface runoff!

Compare that to a city. Only 5 percent fills groundwater aquifers and just 15 percent evaporates into the air. A whopping 75 percent of the rainwater becomes surface runoff! To deal with this runoff, communities build stormwater collection systems which generally collect the water and then drain it, untreated, into rivers and lakes. Research has time and again found a direct link between runoff from paved surfaces and the decline of water quality in streams.

Green roofs can help significantly. On average, 75% of rainwater is retained on a roof that is covered with soil and plants. Just 25% becomes runoff. Plus the soil traps sediments, leaves and particles, essentially treating the water before it even reaches the sewer system.

As you can see, rooftop gardening does more than just bring plants closer to you, it can improve the world!

