ASU sustainability program uses Valley cities as living lab

The world's population has more than doubled in the past 50 years, from 3.2 billion to more than 7.1 billion. Never before has our planet supported such an explosive rate of growth.

How can we provide all of these people with food and water, housing, clothing, heating and cooling, and transportation? Just as importantly, can we ensure that there will be enough for their children and future generations?

Our population isn't just growing — it's also shifting. A century ago, one-fifth of the world lived in cities. Today, more than half of all people do. Cities present their own challenges. For example, on a clear June evening, downtown Phoenix is about 7-10 degrees warmer than the surrounding desert. This urban heat-island effect is caused by manmade materials — roads and parking lots — that hold onto the heat.

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The heat island increases our use of electricity and water, which depletes important resources. The heat also puts some people at higher risk for health problems. Phoenix is not alone facing this issue. Cities around the world — from New York to Athens — are struggling with similar challenges.

To conceptualize and create solutions to these kinds of problems, we need input from multiple disciplines — the physical and social sciences, engineering, business, law and humanities. All of these perspectives are important to create sustainable solutions, ones that preserve natural resources while strengthening communities and promoting economic prosperity.

At Arizona State University, we launched the Global Institute of Sustainability as a hub for concentrating expertise, training future leaders and conducting collaborative research. We work closely with local governments and the private sector to develop policies and practices that help our communities and the world.

How do you study something as broad as sustainability?

One way is by using our own city as a living laboratory. The Central Arizona-Phoenix Long-Term Ecological Research program, led by ASU, is one of 26 such sites in the U.S. funded by the National Science Foundation. Ours is one of only two urban sites, along with Baltimore.

Since 1997, scientists in the program have studied how human behavior affects our desert environment and vice versa. They look at everything from levels of lead in the soil (elevated in central Phoenix and the Southeast Valley), populations of black widow spiders (30 times higher in the city than the desert) and concentrations of pollen in the environment (40 percent from non-native plants).

Once we understand the impact of urbanization, we can address problems in a positive manner. The Sustainable Cities Network, part of Global Institute of Sustainability, brings together local governments to share best practices and develop plans for increasing sustainability. Representatives from Arizona cities meet regularly to discuss ways to increase the urban forest, using trees to reduce the heat island and beautify communities. U.S. Department of Agriculture says a healthy tree has the cooling effect of 10 room-size air-conditioners running 20 hours per day!

The ASU campuses provide additional opportunity to test sustainability practices. Currently, solar panels on all four campuses offer more than 20 megawatts of energy-generating capacity, providing shade for more than 5,000 parking spaces at the same time.

We encourage faculty and students to envision and implement new ideas. For instance, students started a program that collects 500 pounds of used coffee grounds per week to fertilize plants on campus. Their efforts save on fertilizer costs and waste-removal fees and contribute to ASU's goal of becoming carbon neutral and zero waste.

Other students are exploring sustainability challenges on a global level. A recent venture, SafeSIPP, addresses the problems of water transportation, purification and storage. Their invention purifies water through the motion of transporting it in a large barrel.

To learn more, go to sustainability.asu.edu/events or sustainabilityconnect.asu.edu.

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