

INSIGHTS

LETTERS

Evidence of climate change inspires some scientists to rely on bicycles instead of cars, like these cyclists in New Delhi, India.

INGENUITY: NEXTGEN'S VISION

Science-inspired sustainable behavior

We asked young scientists this question: **How has your awareness of science inspired you to adopt more sustainable and environmentally friendly behavior?** Respondents from around the world described scientific concepts, images, and research from a range of fields that inspire them to make environmentally friendly decisions and model sustainable behavior for others, in both their personal and professional lives. Read a selection of the best responses here. Follow NextGen on Twitter with hashtag #NextGenSci. See all NextGen Voices results at <https://science.sciencemag.org/collection/nextgen-voices>. —Jennifer Sills

Transportation decisions

I have witnessed climate change firsthand. The once seasonal river of my village has now turned completely dry. Agriculture is suffering due to decreased rainfall and extreme temperatures. After realizing the effects of our resource-intensive lifestyles, I have tried to conserve energy and water as much as possible. Public transport, cycling, and walking are my preferred modes of transportation. Even in the lab, I try to prevent the waste of electricity, water, paper, chemicals, and plastic. People taunt me for being a miser. However, once I explain my reasoning, they often support me, and many have started following the path of sustainable living.

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There are more than 20,000 unique proteins in our body, but even a small change to one of them can be lethal. The environment, like our bodies, is a complex network of systems, and even seemingly small alterations can lead to drastic consequences. I take this message to heart by using public transportation instead of driving into work. It is challenging to schedule experiments within the transit schedule. However, through careful planning I'm still able to work effectively. Also, transit gives me a dedicated time to read literature, analyze data, and write responses to NextGen Voices surveys.

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Aviation produces about 5% of worldwide CO₂ emissions. Scientists are expected to travel frequently, but forgoing one transcontinental flight per year would decrease carbon emissions more than driving a hybrid car, buying green energy, or eating vegan food. To achieve this, I have limited my attendance at international conferences and switched to digital collaboration. My sustainable behavior has the added benefits of increasing my research productivity and allowing me to spend more time with my family.

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Waste management

As a wastewater engineer who regularly hears about the sewer backups and treatment plant struggles, I have been more conscientious about my grease waste. I collect grease in a bin and bring it to a local restaurant with a dumpster dedicated to grease.

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In poor rural areas of India with little access to food or clean water, women often feed their families first and only eat if there is food left over. Learning about this motivated me to minimize food waste. Now, if food from departmental parties is not eaten, we donate it to organizations that provide food to pregnant women. I

also gradually convinced my neighborhood to donate food to the needy.

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I grew up surrounded by forests. However, as the population increased, trees were cut down and used as firewood and fencing. Forty years later, the area is full of gullies. Seeing erosion firsthand inspired me to reduce demand for trees by not printing material that I can read on a screen instead.

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The organization of lab protocols, waste management, biosafety, and security in a virology lab has given me skills that I've transferred to protect my wider environment. When throwing away everyday items such as medications or household chemicals, I take appropriate biosafety measures to minimize environmental risk.

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Outreach and role modeling

Statistics inspired me to change my behavior. Outliers can drastically change statistical results. As a scientist, I can be the outlier that changes outcomes by raising awareness. To achieve this, I have tried to do more volunteer and extension work to reach the nonscientific public and raise awareness about actions that benefit animals and the environment.

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Geoscientists urge the rest of the world to limit CO₂ emissions, but the scientific community's frequent travels are seen as hypocritical. To address this, I helped start an organization of international researchers that has created a network of scientists and schools. When a researcher travels to a conference, we match him or her with a nearby school that would welcome a free lecture on a scientific topic. We use the necessary travel to maximize societal gain by teaching kids and empowering them to do science.

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Once I realized that all sciences aim to describe and predict the movement and change of matter (and flow of energy), it was impossible not to see the world as an interconnected system. That means that sustainability problems are systems problems. Society needs scientists to live in a more sustainable way, but we need nonscientists even more. We need leaders in industry and government to change the systems by using evidence-based reasoning to devise smarter processes and policies. To address this, I started teaching nonscientists to encourage systemic changes.

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Science diplomacy uses scientific partnerships among nations to solve common problems. As a researcher in a war-torn country, I strive to translate this concept into reality by making changes at the national level through international scientific collaborations. My research on infectious diseases necessitates cross-boundary efforts. Through building effective collaborations, I have implemented several projects funded by international organizations to ease the suffering of underserved communities trapped by conflict and war.

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I was inspired by the epigenetics idea that a phenotype shaped by the environment is heritable without genetic change. Recent findings show that acquired characteristics (such as eating habits) shaped by the external environment can be inherited by the next generation without changes to genes. This means that if I establish a low-carbon lifestyle and healthy eating habits, the next generation can inherit these behaviors, which are beneficial to them as well as to the environment.

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Diet choices

A recent study estimated that we can reduce greenhouse gas emissions by 30% simply by changing our habits from a meat-based to a plant-based diet. After reading the paper, I stopped eating all kinds of meat. I hope to not only reduce my personal impacts on nature but also



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influence other people to adopt more sustainable consumption habits.

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On average, cows eat 6 pounds to gain 1 pound. The same ratio is approximately 2 for chickens and 1.5 for fish. In other words, eating a given amount of beef takes a bigger toll on the environment than eating the same amount of chicken or fish. For this reason, I choose fish, chicken, and vegetables over red meat. Overcoming my preference for the taste of red meat required both creativity in the kitchen and constant reminders that my choices are healthier than the alternatives, for both me and the environment. It also helps to remind myself that, as a scientist, I follow the data over my personal preferences.

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Purchasing habits

Because tap water is not potable in Ghana, plastic sachet bags that hold drinking water have become ubiquitous. Once empty, the bags are often thrown into the streets, and countless reports show the danger they pose to the environment. I have therefore set up a water filtration system at home to produce drinking water and reduce plastic waste.

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Delay discounting—the concept that an individual will forgo a higher reward later for a smaller reward earlier—explains many unhealthy behaviors. Understanding how the environment influences our behaviors is a good step to make healthier choices. This concept helps me to make more sustainable purchasing decisions. Once I learned the power of marketing, such as sales items framed in a way to induce excessive consumption, I found ways to improve my self-control.

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I was shocked and saddened to see pictures of the amount of plastic in the oceans and to read the scientific studies of all the ways plastic and other types of pollution are harming ocean life and damaging ecosystems. To do my part, I've been making an effort to carry reusable bags and water bottles so that I don't need to waste plastic. I also go out of my way to purchase items that don't use plastic wrapping or packaging. I hope to reduce my family's plastic footprint and to serve as an example for others.

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The One Health concept unifies environmental, animal, and human health. Humans and other animals live in a shared environment. This concept makes clear that my behavior deeply affects the health of animals and the environment. When I recognized this, I increased

my food purchases at local food fairs to reduce the fuel spent on transporting the food I consume.

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Pollution is affecting our air and water, especially in developing countries, which is exacerbating problems caused by climate change. In response, I stopped buying clothes from “fast fashion” companies that pollute the environments where their factories are located. When I need new clothes, I buy from ethical, sustainable companies or I shop at local consignment shops.

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Political action

I take public transportation, limit flying, and buy organic, plant-based food. However, no individual actions will stop the current system from continuing as it is. Real change will require the disruption and ultimate destruction of the fossil fuel industry. Marches such as Greta Thunberg's School Strike for Climate and the Extinction Rebellion in London, which block freeways and runways, are a good start. Only a cultural revolution has any chance of leading to a sustainable, or even just tolerably habitable, world.

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There are a lot of actions people can take to reduce their greenhouse gas emissions. However, it is incredibly unlikely that individuals can reduce emissions enough to prevent the worst effects of climate change. That will require collective action through governments and public policy. Therefore, I vote only for federal, state, and local candidates with strong, transparent climate policies. Without effective policies, individuals' efforts to reduce emissions can be completely undone by those who prioritize profit or short-term expediency. Governments won't change until people win or lose elections based on climate policies. It's up to us to make that happen.

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In Ghana, potable water is sold in single-use sachet bags, leading to plastic waste and pollution.

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NextGen Voices: Science-inspired sustainable behavior

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