Engineering humans to tackle climate change

So far, conventional solutions to global warming new government policies and changes in individual behavior haven't delivered. And more radical options, such as pumping sulfur into the atmosphere to counteract warming, pose a great deal of risk.

There may be another route to avoid the potentially disastrous effects of climate change: We can deliberately alter ourselves, three researchers suggest.

Human engineering, as they call it, poses less danger than altering our planet through geoengineering, and it could augment changes to personal behavior or policies to mitigate climate change, they write in an article to be published in the journal Ethics, Policy and the Environment.

"We are serious philosophers, but we might not be entirely serious that people should be doing this," said Anders Sandberg, one of the authors and an ethicist at Oxford University in the United Kingdom. "What we are arguing is we should be taking a look at this, at the very least.]

Some have proposed we engineer ourselves to address climate change.

Their suggestions

In their article, they put forward a series of suggestions, intended as examples of the sorts of human engineering measures that people could voluntarily adopt. These include:

Induce intolerance to red meat (think lactose intolerance), since livestock farming accounts for a significant portion of greenhouse gas emissions.

Make humans smaller to reduce the amount of energy we each need to consume. This could be done by selecting smaller embryos through preimplantation genetic diagnosis, a technique already in use to screen for genetic diseases. "Human engineering could therefore give people the choice between having a greater number of smaller children or a smaller number of larger children," they write.

Reduce birthrates by making people smarter, since higher cognitive ability appears linked to lower birthrates. This could be achieved through a variety of means, including better schooling,electrical stimulation of the brain and drugs designed to improve cognitive ability, they propose.

Treat people with hormones, such as oxytocin, to make us more altruistic and empathetic. As a result, people would be more willing to act as a group and more sensitive to the suffering of animals and other people caused by climate change.

Engineering the Earth

Frustration with the gap between measures to address climate change and rising greenhouse gas emissions has prompted a colorful array of geoengineering, or planet-altering, solutions. These include pumping sulfur particles or other aerosols into the atmosphere to reflect the sun's warmth back out into space; seeding the oceans with iron to prompt algal blooms that would, in theory, suck carbon out of the atmosphere and eventually tuck it away in the seafloor; and perhaps most realistically, pumping the excess carbon into reservoirs and storing it there.

In general, these solutions are problematic because they cannot be ground-tested before being implemented, and once implemented, the effects would be global, according to Sandberg.

"If I want to test out one of those brain-enhancing devices, I can test it on medical students. If something goes wrong, I might get a lawsuit, but it is a localized problem. How do you test geoengineering?" Sandberg said. "How many Earths do we have to test on?"

What's more, a change that benefits one country may hurt another, he said.

Changing ourselves

The concept of human engineering isn't new. Sandberg studies the ethics of human enhancement, or "all the tools we have to mess with ourselves to improve our performance," as he puts it. "A lot of them are quite controversial, except the ones we don't recognize," he told LiveScience.

Someone will tell you, "'I think it's horrible people take pills to become smarter,' but they are saying it over coffee," he said alluding to the alertness-enhancing effects of caffeine in the coffee. Supplementing salt with iodine is credited with preventing brain damage in infants, and as a result, boosting intelligence around the world.

Fluoride is put into water systems to protect our teeth, and we receive vaccines to protect against disease. Both measures just like human engineering measures that could address climate change carry risk, but they have been widely adopted, Sandberg and his colleagues point out.

"Now, we are not that interested in saying the government should impose any of this stuff. … It is more interesting to think about what can people actually do to modify themselves that might be green," he said. "I am mildly skeptical if anything we propose is going to happen. I think it's most likely green changes to human nature aren't anything we have thought of."

Source: Live Science

SELF-MEDICATION

When faced with pathogenic fungi, bees line their hives with more propolis - the waxy, yellow substance seen here.

Bees treat themselves

THE colony is willing to expend the energy and effort of its worker bees to collect these resins," says Dr. Michael Simone-Finstrom, a postdoctoral research scholar in NC State's Department of Entomology and lead author of a paper describing the research. "So, clearly this behavior has evolved because the benefit to the colony exceeds the cost.

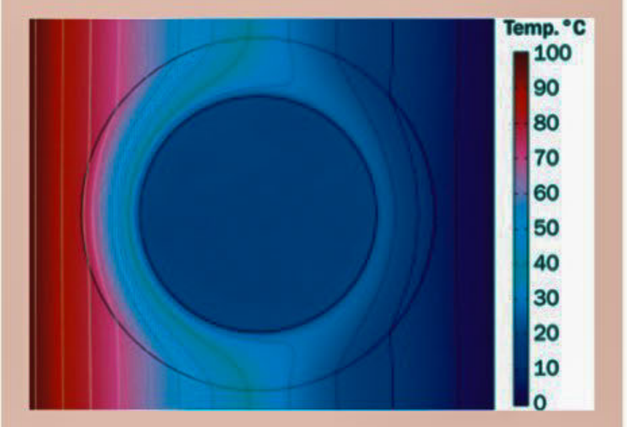
Wild honey bees normally line their hives with propolis, a mixture of plant resins and wax that has antifungal and antibacterial properties. Domesticated honey bees also use propolis, to fill in cracks in their hives. However, researchers found that, when faced with a fungal threat, bees bring in significantly more propolis -- 45 percent more, on average. The bees also physically removed infected larvae that had been parasitized by the fungus and were being used to create fungal spores.

Researchers know propolis is an effective antifungal agent because they lined some hives with a propolis extract and found that the extract significantly reduced the rate of infection.

Source: Science Daily

HEAT SHIELD

Cloaks for hiding heat



With a constant 100° Celsius heat source coming from the left-hand side, the area contained inside a theoretical thermal cloak (center circle) remains cool relative to its surroundings.

A NEW type of invisibility cloak could take the heat off hot devices. A theoretical cloak that can shield a protected area from intense temperatures is described online March 26 in Optics Express.

"You can just dress your satellite in a thermal cloak," says study author Sebastien Guenneau, of the French National Center for Scientific Research and the University of Aix-Marseille. A heat cloak just 1 or 2 centimeters thick might potentially protect a satellite from overheating as it re-entered the atmosphere, he says.

Until now, most invisibility cloaks have been made from metamaterials that guide light waves around a certain region of space, obscuring anything that lies within from sight. Similar cloaks have been designed to distort the trajectory of sound waves.

In the new study, similar ideas were applied to bend heat as it disperses in space. In a two-dimensional cloak, most of the heat could be manipulated to move around a cloaked region 300 micrometers across, or the size of a typical amoeba.

Though heat isn't completely blocked, but only slowed, from dissipating into the cloaked area, Guenneau says there are potential applications for preventing materials from heating up too fast.

Source: Science News

CORRECTING HISTORY

Scientists refine earth's clock

NEW research has revealed that some events in Earth's history happened more recently than previously thought. Scientists from the British Geological Survey and the Massachusetts Institute of Technology, publishing recently in the journal Science, have refined the data used to determine how much time has passed since a mineral or rock was formed. They report uranium isotopic composition of minerals, used to date major geological events, which are more accurate than previously published. The major effect of this is to reduce previous age determinations by up to 700,000 years.

Minerals naturally capture uranium when they form, which in turn undergoes a chain of radioactive decays to other elements, ending with lead. This new research has shown that, by more accurately measuring the relative amount of the uranium isotopes 238U and 235U, we now have a better understanding of how much time has passed since a mineral or rock has formed.

A major effect of this work will be to decrease all previous uranium-lead (U-Pb) age determinations, by up to 700,000 years for samples that are about 4.5 billion years old -- the age of Earth. In particular, the new 238U/235U ratio will allow geologists to place more accurate limits on the exact timing of a broad range of geological processes, from the initial formation of our planet, continents and economic mineral deposits, to past evolutionary events and climate change. Left: Uranium is purified from dissolved minerals. Right: 238U/235U is measured with a mass spectrometer.

238U/235U is measured with a mass spectrometer.

Blair Schoene, a geologist from Princeton University said "This new determination will not only improve the accuracy of each U-Pb age but ultimately our understanding of events in Earth history."

For over 35 years, a 238U/235U ratio of 137.88 has been used to calculate U-Pb dates, from the oldest rocks that formed four billion years ago, to much younger rocks that are hundreds of thousands of years old. When scientists recently evaluated the measurements used to arrive at the 137.88 value, they came to a dead end: the value could not be traced back to standard units such as the kilogram.

This new study shows that many naturally occurring uranium-rich minerals, such as zircon, actually have a lower 238U/235U value with an average of 137.818 ±0.045 (the uncertainty assigned to this value relates to the variation observed between different samples).

Source: Science Daily

MENTOR-MENTEE

Young women scientists' workshop

AN international workshop on "Mentor-Mentee" program was organized by Bangladesh Academy of Sciences on 24-25 March 2012 at NMST Auditorium, Agargaon, Dhaka. The theme of the workshop was Challenges of Young Women Scientists in New and Emerging Sciences.

A group of 50 young women scientists (age less than 40 years) were selected from various public and private universities and research organizations from all over the country to be "Mentee".

The "Mentors" were renowned scientists from home and abroad. The delegates from abroad included Prof. Farida Habib Shah, TWAS fellow, from Malaysia; Prof. Sunethra Atukorala from Sri sLanka ; Prof. Nilam Shrestha and Dr. Sanju Shrestha from Nepal. Prof. Dr. Hazera Mahtab of BIRDEM, Prof. Sultana Shafee, Prof. Z N Tahmida Begum, Prof. Dr. Fauzia Moslem, Prof. Haseena Khan, Prof. Shahida Rafique and Prof. Zeba Islam Seraj were among the mentors along with the foreign delegates and the coordinator. Prof. Shamima K Choudhury of Dhaka University was the proposer and coordinator of the workshop.

The Honble State Minister for Science and Technology, architect Yafes Osman was the Chief Guest in the inaugural session of this workshop and Prof. M Shamsher Ali presided over the function.

The main aim of this workshop was to develop a sustained relationship between experienced women scientists who give advice as mentors to less-experienced young women scientists i.e. mentees. There were panel discussions in themes such as Successes and barriers for women scientists in pursuing scientific dreams and Public communication for women in science. The panellists stressed the role of media in promoting science to the public as the number of science graduates are alarmingly dropping in last couple years as compared to business studies.

Farida Habib Shah, Vice-President of Organization of Women in Science in Developing World (OWSD) stressed that mentor-mentee workshop can be a role model for other developing countries also us.

Report was provided by Shamima K Choudhury, Professor, Department of Physics, University of Dhaka.

The participant "mentees" and the "mentors" of the workshop.

WARTY LUMPS FLAVOUR

It's not all about location

The aromatic signature of the Burgundy truffle is best explained by genetics, not the local environment.

Mon dieu! A truffle's delectable aroma may be as much about genetics as it is about geography.

For years a truffle's flavor has been mostly attributed to environmental factors, akin to how terroir the soil, climate and geology of a region bestows qualities to wine. But a new analysis, published online March 6 in New Phytologist, finds that a truffle's particular blend of chemical compounds is linked instead to its genetic background.

By casting light on what gives these elusive underground fungi their prized flavor, the study could help transform several truffle species from wild harvest to consistent crop.

"Truffles are a really valuable natural resource, and it's the aroma that really gives them their value," says Gregory Bonito, an expert in truffle evolution at Duke University.

DID YOU KNOW?

Who first invented vaccination?

Most historians document the first vaccination to be around 1796 when English doctor Edward Jenner observed that people working in close proximity to cows were completely immune to the smallpox virus.

Going back to Dr Jenner's original observations he quickly came to the conclusion that somehow the workers were picking up the less dangerous cowpox virus which in turn left them completely immune to the far more dangerous smallpox.

After some experimentation he injected an 8 year old boy with a small amount of cowpox and confirmed his original hypothesis.

The picture above is of a young Bangladeshi girl taken in 1973 and demonstrates how severe the outbreak on the body was.