

Scientists reveal how to 'renovate' Mars' climate so humans can live there

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A new paper in *Nature Astronomy* has brought the idea of terraforming *Mars* back into the conversation. Researchers from Pioneer Research Labs and the University of Chicago explore whether it's scientifically feasible to turn Mars into a planet that can support human life — and what it would take to make it happen.

" Believe it or not, since 1991, no one has really addressed the question of whether geoclimatization of Mars is possible ," said study co-author Nina Lanza. *" But since then, we've made huge strides in Mars research, geoengineering, spacecraft capabilities, and biology . All of this provides an opportunity to look at geoclimatization in a new and truly feasible way ."*

While the idea of making Mars more Earth-like has been around for a long time, there hasn't been much detailed scientific work on the subject. But now, thanks to advances in climate science, biology, and space technology, researchers say it's time to take a fresh, serious look at it.

The basic idea is to first warm the Martian atmosphere. This could allow engineered microbes to begin producing oxygen through photosynthesis. Over time, this oxygen would build up, eventually supporting the presence of liquid water and paving the way for more complex life. But the paper points out that before we jump into such grand plans, we need to think seriously about the costs, the potential risks, and whether it's the right thing to do:

Before we can assess whether warming Mars is worth it, compared to leaving Mars as a pristine wilderness, we must confront the practical requirements, costs, and potential risks.



The paper takes a close look at the resources Mars actually has—like water ice, carbon dioxide, and the composition of the planet's soil. It also considers new ideas that could help raise the planet's global temperature by tens of degrees within decades. Some of these approaches involve boosting solar heating or releasing greenhouse gases to trap more heat in the atmosphere.

Future research should focus on further understanding the physical, chemical, and biological limits of these ideas. Doing so could not only guide future Mars missions—it could also help science here on Earth. Tools like soil repair technology, drought-tolerant crops, and better ways to model ecosystems could also benefit our planet.

And in the long run, if humans can learn to geo-climate a world like Mars, it could be the first step toward even more distant destinations.

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