

How synthetic biology can help world meet UN sustainable development goals

The agenda of the UN's *Sustainable Development Goals* (SDGs) challenges the synthetic biology community—and the life sciences as a whole—to develop transformative technologies that help to protect, even expand our planet's habitability. While modern tools for genome editing already benefit applications in health and agriculture, sustainability also asks for a dramatic transformation of our use of natural resources. The challenge is not just to limit and, wherever possible revert emissions of pollutants and greenhouse gases, but also to replace environmentally costly processes based on fossil fuels with bio-based sustainable alternatives. This task is not exclusively a scientific and technical one but will also require guidelines and regulations for the development and large-scale deployment of this new type of bio-based production. Some recent advances that can (or soon could) enable us to make progress in these areas—and several possible governance principles—need to be addressed.

The transformative power of modern, science-based biotechnology that started in the late 1970s has been accelerated by recent developments, such as massive DNA synthesis/sequencing, systems and synthetic biology, and CRISPR tools for genome editing. The interface of these disciplines and techniques with other flagship technologies of the ongoing Fourth Industrial Revolution, such as artificial intelligence, robotics, big data, ITs, and so on, will usher in a society, economy and industry that are very different from what we know today.

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