

ENHANCED PHOTOSYNTHESIS (TECHNOLOGY BRIEFING)

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OVERVIEW

Photosynthesis enhancement is a theoretical geoengineering technology based on the idea that plants and algae can be genetically modified to exhibit “more efficient” photosynthetic traits, leading those organisms to absorb and metabolize more CO₂. According to critics of the approach, enhancing photosynthesis by converting plants is a high-tech, high-risk project, with high risks to food security in particular.

There are serious concerns that accompany all genetic engineering of plant life, involving unexpected side effects, risks of contamination in natural systems, poorly-understood long-term impacts on humans and ecosystems, and corporate control. Proponents primarily justify research into altering the photosynthesis of plants through food security arguments: that world population is growing, crop yields have reached a plateau and, given growing demands for food and fuel in the face of climate change, we must find a way to increase crop yields. For geoengineering photosynthesis engineers, “the key remaining route to increase the genetic yield potential of our major crops” is enhancing photosynthesis. However, since this modification is designed to remove more CO₂ by photosynthesis from the atmosphere, carbon dioxide removal (CDR) aims are also used to justify this research. The anticipated CDR effects of enhanced photosynthesis are based on the assumption that the additional CO₂ that would be absorbed by the genetically modified plants would permanently remain in soils or at the bottom of the sea.

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