

# What is a sustainable biotechnology?

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## Abstract

Biotechnology is loosely defined as the use of biology to develop new products, methods and organisms intended to improve human health and society. However, when the equally ambiguous term sustainable is added as an attributive adjective, it is hard to know what exactly is being discussed. Unsurprisingly, companies of all sorts have determined that this term refers to whatever they are selling. And equally predictably, such claims can be supported by the careful selection of sustainability metrics that support this assertion, and often the willful omission of any that do not. Sustainability discussions invariably involve multiple competing goals. This is particularly true with agricultural biotechnologies which necessarily involve farmers, agricultural systems, food production, and consumers. Proponents and critics are often at loggerheads because the two groups are giving different sustainability goals credence. It can simultaneously be true that a technology that improves yields and food security while simultaneously reducing the environmental footprint and cost of food production, might also negatively impact animal welfare, or adversely impact the market of local farmers. And equally, a product that has lower greenhouse gas emissions per unit of weight, might rise to the top of the rankings when looked at on a nutritional rather than a weight basis. Because of these complexities, the fact that a biotechnology has a positive effect on a single sustainability metric is not sufficient to declare it sustainable. Equally important, the fact that a biotechnology has a negative effect on a sustainability metric should not be sufficient justification to preclude its use. Such dichotomous framings are antithetical to the type of systems thinking required when contemplating innovations in agricultural production systems. Ultimately sustainable biotechnologies will be those that are predicted to do more good than harm in the specific systems and societies into which their introduction is being proposed.

**Key words:** goals, tradeoffs, nuance, sustainability, metrics