

# Healthy Plants for a HEALTHY PLANET

Plant health  
is **your** health.



**Life as we know it would be impossible without plants!** Terrestrial plants take water from the soil and CO<sub>2</sub> from the atmosphere and use the sun's energy to undergo photosynthesis to make the food we eat and oxygen that we breathe.



Plants provide food, feed, and fiber but **plant diseases and pests reduce yields by 15-30%** globally in major staple food crops. New technologies are creating plants that resist pathogens, uptake nutrients, carbon, and water efficiently, and improve environmental remediation to advance agricultural sustainability.



## Wheat

Wheat is an important staple food crop and provides 20% of the daily protein for 4.5 billion people globally. The use of fungicides and resistant varieties improves yields for wheat and reduces the greenhouse gas emissions of wheat production by up to 15% compared to the untreated wheat crops.



Plants can be used to “bio-farm” vaccines, providing some of the earliest candidate vaccines for Hepatitis B virus and foot-and-mouth disease virus. Plant-based vaccines can be **well suited for rapid-response vaccine production.**

Beneficial microbes help plants fix nitrogen, reducing the need for synthetic fertilizers. An estimated **55 million tons of nitrogen** are fixed annually in agricultural systems reducing nutrient pollution in the environment.



**Plants and microbes can sequester and degrade organic pollutants** such as polychlorinated biphenyls (PCBs)—carcinogens that are common pollutants in many industrial sites. Fungi and bacteria associated with plants were able to reduce PCB contamination by up to 50% in 12 weeks.

**Climate change threatens agriculture and plant health** around the world. Increased CO<sub>2</sub> in the atmosphere reduces nutrient uptake in plants by an average of 8% even with supplemental fertilizer, resulting in less-nutritious food.



Sources: Data in list from Roach, 2004 ([www.nationalgeographic.com/news/2004/6/source-of-half-earth-s-oxygen-gets-little-credit/](http://www.nationalgeographic.com/news/2004/6/source-of-half-earth-s-oxygen-gets-little-credit/)); Savary et al., 2019 ([www.nature.com/articles/s41559-018-0793-y](http://www.nature.com/articles/s41559-018-0793-y)); Rybicki, 2014 (<https://virologyj.biomedcentral.com/articles/10.1186/s12985-014-0205-0>); Herridge et al., 2008 (<https://link.springer.com/article/10.1007/s11104-008-9668-3>); Stella et al., 2017 ([www.sciencedirect.com/science/article/abs/pii/S0304389416310652](http://www.sciencedirect.com/science/article/abs/pii/S0304389416310652)); Loladze, 2014 (<https://elifesciences.org/articles/02245>). Data in sidebar from GCARD, 2012 ([www.fao.org/docs/eims/upload/306175/Briefing%20Paper%20\(3\)-Wheat%20Initiative%20-%20H%C3%A9%20Lucas.pdf](http://www.fao.org/docs/eims/upload/306175/Briefing%20Paper%20(3)-Wheat%20Initiative%20-%20H%C3%A9%20Lucas.pdf)) and Berry et al., 2008 (<https://bsppjournals.onlinelibrary.wiley.com/doi/full/10.1111/j.1365-3059.2008.01899.x>).



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