WHAT WILL BE ON OUR PLATES TOMORROW?

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How will we feed the planet's rapidly rising population? The alarming impact of the food industry on climate change demands new ideas. Alternative sources of protein, vertical farming, and the zero-waste movement all offer hope. Clearly there is no shortage of sustainable solutions—the only challenge now is to revolutionize our taste buds.

Lab-grown chicken. Bug burgers. Scrambled eggs made from plants. It might sound like science fiction, but these dishes are all destined to be on tomorrow's menu, alongside leafy greens grown in vast indoor farms. Why? Because by 2050, the world's population is expected to have topped 9 billion people, boosting the demand for food production by as much as 50 percent. And, as people in low- and middle-income countries get wealthier, they will crave more meat, fruit, and vegetables. The big question isn't how will we feed the planet, but how will we feed it *sustainably?*

The global food system *already* has a major impact on global warming, from the use of fossil fuels in fertilizers to deforestation to greenhouse gas emissions from livestock and transportation. "The way we produce food today is a massive driver of climate change," says Simon Caspersen, communications director at SPACE10, a Copenhagen-based research and design lab that's on a mission to design more sustainable ways of living. "It requires loads of resources for production, transport, and cooling; it uses our dwindling supplies of fresh water; and it's a major cause of deforestation."

Make no mistake: how we produce food has many consequences for people and the planet. For instance, conventionally grown crops may seem cheap — but the price we pay in shops tends not to cover the environmental cost of using harmful pesticides and herbicides. And, as the planet's population increases, the amount of arable land decreases, putting further pressure on the global food system. However, as the emergence of forward-thinking labs like SPACE10 suggests, the search is on for innovative solutions that can help feed our growing population sustainably.

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01 SPACE10 have turned their attention to making ice cream from hydroponically grown herbs and microgreens.

02 A pop-up farm by SPACE10, shows how crops can be grown hydroponically — that is, in nutrient-filled water rather than soil.

Down on the Farm

One much-trumpeted solution is vertical farming. Also known as indoor farming, it imagines a world where we can grow what we need, when we need it — without worrying about the weather. The world's largest vertical farm is operated in Newark, New Jersey, by AeroFarms. Thanks to the company's state-of-the-art aeroponic technology — which uses LED lights to mimic the sun and gives its crops the right mix of nutrients, water, and oxygen — AeroFarms produces locally grown, pesticide-free food, all year round, using 95 percent less water than conventionally grown food. Though the energy demands of vertical farms is high, when it comes to food miles, they couldn't be more local. Just look at the Good Bank, a restaurant in Berlin. It serves salads made with leafy greens grown in an indoor vertical farm located just behind the counter.

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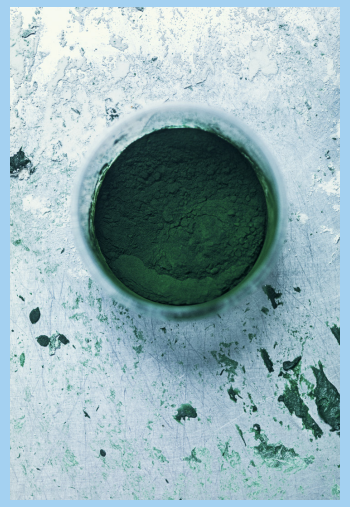
Then there's algae. Yes, algae — as in the green goo that clogs up waterways. Because it's packed with vitamins and minerals and and contains twice as much protein as meat does, algae has long been seen as a potential "super food." Today, it is being explored as an alternative to two ingredients partly responsible for the destruction of the rainforest — the soy protein that's used in animal feed; and palm oil, one of the key ingredients in many processed foods.



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But nothing has grabbed the media's attention quite like the burgeoning food-tech movement. Take JUST, a San Francisco-based company that develops plant-based alternatives to popular dishes and ingredients — such as scrambled eggs made from mung beans. "We tap into the vast plant

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03 Spirulina is a strain of microalgae that looks set to play an increasing role in our diet of the future.

04 In a project dubbed "Tomorrow's Meatball," SPACE10 is looking at ways to create meatballs from alternative ingredients that include mealworms and root vegetables, such as carrots, parsnips, and beets.

kingdom to address what we believe is a limitation in the tools and mindset of the global food system," explains Andrew Noyes, head of communications at JUST.

JUST is also seeking to develop cultured Wagyu beef using cells from prized cows in Japan. That makes it one of several companies seeking to bring lab-grown meat to market and provide people with an alternative to meat produced from livestock. As well as allaying ethical concerns about eating meat, this would help reduce the greenhouse-gas emissions of the livestock industry.

Another way to do this, of course, is to use protein-packed insects in dishes—like the Bug Burger, a conceptual dish devised by SPACE10 and made with meal-worms, or the snacks made by companies such as Chirps Chips in California: made using cricket flour, they are a sustainable alternative to conventional wheat-based products.

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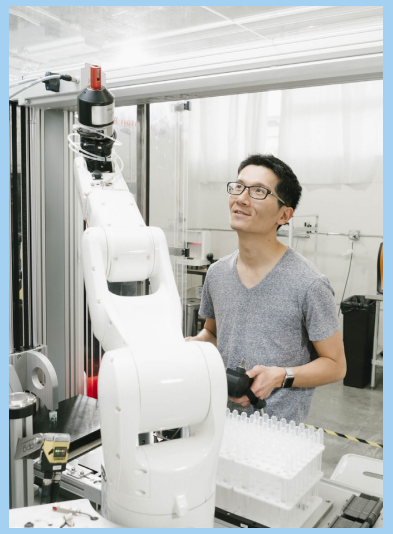
05 SPACE10's Bug Burger is made from beet, parsnip, potato, and mealworm—the larval form of a darkling beetle.

06 Among the dishes on the Bad Taste menu is this salad of *hijiki* (a brown sea vegetable), cabbage, fried *mochi*, anchovy, sesame, bonito, and scallion.

The Way We Eat

Though innovative solutions such as vertical farming will doubtless play an increasing role in the years to come, many people in the food industry believe we don't just need to change how we produce food, but what we eat too. Dan Barber is the founder of Blue Hill at Stone Barns, a restaurant north of New York City. His role as a chef, he says, is to influence the way people eat—and the agent of change is "deliciousness." From this perspective, restaurants such as Blue Hill should be seen as "cathedrals of ideas" that can help change food culture. For example, when chefs champion legumes like lentils and chickpeas, those ingredients are more likely to "trickle down" into the mainstream. Barber has cited the popularity of Greek yogurt and quinoa as proof of the influence of restaurants on consumer taste.



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07 A food technology room at JUST, Inc. Industrial kitchens of the future may look more like science laboratories than food plants.

08 At the QO in Amsterdam, over seventy varieties of vegetables, herbs, and fruit are grown in a greenhouse on the hotel's rooftop.

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Others see art as a vehicle for changing how people think about food and how to consume it. Take Jen Monroe, who runs a project in Brooklyn called Bad Taste. She throws creative dinners featuring "edible artworks" that advocate using seafood ingredients like octopus and seaweed rather than overstocked fish such as tuna and salmon. "Depicting what our diets could, by necessity, look like in 30 years as a result of the loss of certain familiar food sources is a clear way to make some of these changes less abstract," she explains.

Learning From Nature

Then there's the burgeoning zero-waste movement, whose proponents seek to make better use of the food they've already got—often by redefining what should be considered "waste." Take the Copenhagen-based restaurant Amass, founded by former Noma head chef Matt Orlando. It is pioneering a closed-loop system in which everything it produces is reused, if possible. At Amass, for example, any leftover table water is collected at the end of the night, sterilized, and used for cleaning and in the aquaponic system, while used coffee grounds are baked into cookies.

Ultimately, of course, reducing waste and food miles is about reconnecting with the land and redefining the value of food. "Human beings have had only the blink of an evolutionary eye to invent things, while nature has benefited from a 3.8-billion-year head start in research and development," explains Caspersen. "With that level of investment, it only makes sense to look to nature for solutions before trying to invent them ourselves. We need to be better at learning from nature and working with it."

To that end, education will surely be key—especially our children's. Activist Alice Waters helped pioneer the farm-to-table movement in the 1970s when she opened her restaurant Chez Panisse in Berkeley, California. In 1995 she launched the Edible Schoolyard Project at a school nearby. Its hope was that by showing children how to maintain a garden, they would understand as young as possible where their food comes from—and thus become ambassadors for future generations.

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As we seek more sustainable means of producing food, it's clear that there's no silver bullet, no one-size-fits-all solution. Organic farming and the pursuit of deliciousness will surely sit alongside innovative ideas such as lab-grown meat and cricket flour. And according to Caspersen, emerging technologies such as AI and blockchain could also help "increase efficiency, transparency, traceability, food safety, and collaboration throughout the food system."

Yet no matter what combination of solutions we embrace, one thing is clear: the choice to support a more environmentally friendly food system is certainly ours as consumers and diners to make. Indeed, as Alice Waters put it in her 2017 memoir, *Coming to My Senses: The Making of a Counterculture Cook,* "Eating is an everyday experience, and the decisions we make about what we eat have daily consequences. And those daily consequences can change the world."

09 Preparation for lunch at SPACE10. Whatever's on the menu, it's likely that any herbs, leaves, and vegetables will have been grown hydroponically.

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