

IF NOT MEAT...



As food sources dwindle worldwide, alternatives are not just a necessity. They may in fact, be an opportunity.

BY SEAN REYNAUD

THEN WHAT?

Since 1945, the world has benefited from the stabilization of the geopolitical order in many ways, creating the mass consumption societies we now enjoy. A secure, global supply chain and a somewhat stable world order all have benefitted trade worldwide. The technological miracles of our modern age, and the fact that Mexican avocados can travel to Poland nestled in cheap cardboard boxes in a matter of days, have had a massive effect on the world.

Pause momentarily and reflect on the wonder of your double-shot macchiato, adorned with generous swirls of whipped cream and complemented by the subtle flavors of an accompanying tiramisu. The coffee beans were procured from Colombia, the chocolate from the Ivory Coast, and the cane sugar from Brazil, all of which somehow ended up in your Chinese-made ceramic cup. Let's not overlook the tiramisu's components: this delicacy's creation demands a complex network that spans the globe to gather materials from diverse corners of the world. Let us refrain from dwelling on the potential impact of this sugary onslaught on your dental health or its potential to spark diabetes or unsettle your digestive system. Instead, let's focus on the effects the trade networks have had on the world.

GLOBAL MARKETS, GLOBAL CONCERNS

Consider a scenario where the movement of food across different regions triggers significant shifts in the demographics of entire populations. Borders become more permeable, allowing migrants to traverse freely for work, habitation, and immigration. The convenience of modern grocery store logistics leads to extended lifespans and a wider array of affordable food options, except for inflationary factors. Our societal progress has far exceeded the aspirations of our ancient cave-dwelling predecessors. Nevertheless, these advancements have come at a cost to our planet, presenting us with considerable challenges.

Notably, a convergence of issues arises. Bacteria such as e-coli and salmonella, fostered by their proximity to factory farms, infiltrate our food chains through runoff, posing a threat to our lettuce and other consumables. And lest one thinks, "Well, let's just dust it off!" No, you can't. The only way to kill salmonella or e-coli is to boil the leaves, making for an unpalatable, goopy salad. Imagine it, eating salad with a spoon!

Documentaries such as "Super Size Me" and the latest offering on Netflix, "Poisoned: Revealing the Unhealthy Realities of Your Food," shed light on the perils linked to mass food production. While sparing the explicit and, frankly, stomach-churning details from these documentaries, it's reasonable to assert that our quest for the most succulent burger has contributed to some rather alarming ecological predicaments. And unless you've spent this summer residing beneath a boulder – which, by the way, might just

be a more comfortable choice given the heat – you're likely aware of the ongoing wildfires in various regions in Canada, Greece, the USA, Siberia, and beyond.

Unfettered gluttony has expanded waistlines and caused environmental issues that may yet send us back to the caves – provided we can still fit through the entrances. The emergence of lifeless zones, those low-oxygen or hypoxic regions within lakes and oceans worldwide, can be traced back to agricultural runoff, emissions from fossil fuels, and pervasive water pollution. Algae blooms and the rapid proliferation of seaweed, largely spurred by elevated phosphorus and nitrogen levels originating from industrialized farming, are smothering our oceans.

Ammonia, a byproduct of animal activities, seeps into groundwater or navigates through waterways, eventually reaching larger aquatic bodies. Presently, an estimated 700 established dead zones sprawl across a considerable expanse of approximately 245,989 square kilometers – an area roughly comparable to the size of New Zealand. Among these expansive lifeless zones, notable ones include the Gulf of Oman, spanning an impressive 164,979 square kilometers, and the Baltic Sea, extending over 69,990 square kilometers.

SEARCHING FOR ALTERNATIVES

The picture may seem bleak, and it sure is. But for some, it presents an opportunity to get in on the ground floor of investments in alternative food sources that are more energy-efficient and more sustainable.

Venture capitalists such as Michał Piosik and Piotr Grabowski of Poland's AC/VC Foodtech Impact Fund are actively funneling their investments into the future of food. At the 2023 Infoshare event, Michał Piosik delved into their approach towards food alternatives, and the results of which they have every right to feel proud: "For us venture capitalists, the more rapid the growth of our investments, the more advantageous it becomes. To be candid, the equity appreciation on our recent investments has skyrocketed by an impressive 700%."

Simplified yet practical products like vegan yogurts, crafted from locally sourced soybeans in Poland, have the potential to swiftly penetrate the market and yield substantial returns. Anticipating the future, cell-based meats cultivated from animals will emerge as cruelty-free protein alternatives within a decade. Presently, plant-based proteins constitute around 30% of the total, but cell-based meats may contribute up to one-third in the future.

A decade ago, the cost of producing cell-based meats was roughly \$150,000, a figure that has now plummeted to approximately \$63. "Let's not deceive ourselves. In the context of meat, pricing plays a pivotal role in driving consumer choices," Piosik remarked.

Still, a \$63 hamburger that isn't wagyu beef, seems hard to swallow.

THE NEW MEAT MARKET

According to Piotr Grabowski, approximately 50 companies worldwide are currently engaged in the field of cell-based meats, and this number is likely to double by the end of this year. Raising awareness that cell-based meats are distinct from GMOs and are essentially cultivated protein derived from animal cells, can significantly contribute to their increased adoption. Additionally, ethical considerations play a role; the idea of sparing animals from slaughter for food production makes cultured foods a more morally acceptable option.

Indeed, AC/VC Foodtech has already invested in several Polish startups, including: Yoush, Apollo Roślinny Qurczak, Listny Cud, Hempiness, Frens, Tribe Natural Energy, myEgg, Planeat, SERio and many more. They are getting ahead of trends, forging a new future in alternative foods.

Government regulations will also play a pivotal role in assuaging concerns. While the traditional industry may attempt to impede innovation through lobbying efforts, historical patterns suggest that, like other advancements in food technology, acceptance of cell-based meats will eventually prevail. As Piotr Grabowski put it, cell-based meats are “not targeted to destroy industries, but in the end it will be a much more efficient way of producing protein for people.” The margins for meat producers have been in the single digits, but at the same time, margins for plant based meats are often in the double digits, even up to 30%, 40% or even 50%.

BEANS OR BUGS?

Bean-based proteins in the past didn’t always taste so good. However, because food producers benefited from an established distribution network, they could move products that, quite frankly, tasted more like cardboard than meat. The texture was not meaty either, with a lot of early efforts coming closer to hardened tofu than meat. Still, the technology has grown over the decades. More science is now involved in flavoring and injecting nutrients, like B12, into bean-based meats. Without a science-based approach to bean-meat production to produce flavorful, healthy bean proteins, the industry risks drying up.

Now we come to the icky six-legged basis for meat substitutes that most Westerners find appalling: insect-based protein. In 2018, the UN published a report on the state of protein consumption worldwide and suggested that insects may be a way to meet [meat?] demand. But Krzysztof Cieciora, a deputy agriculture minister in Poland, suggested that eating insects was part of a campaign to overturn the “dietary values of the West.” He went so far as to call the situation “a battle, a food war.”

So far, insects in Poland are bred only for animal feed. There is, however, interest in bug farm investments. HiPro-Mine, a producer of insect protein used in animal feeds, is building a research and development facility worth PLN 215 million. The launch of the 25,000-ton feed production plant

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is planned for the first half of 2024. Last year, the company completed the first stage of construction of a hatchery in Robakowo, enabling industrial production.

In some ways, Deputy Agriculture Minister Cieciora is correct in that diets will change, and we as a society will not like it. Whether we eat grasshopper burgers, soybean chicken, or Soylent Green (“It’s people!”) things will have to change if we are going to sustain 9, 10 or even 11 billion people. Yet 2 billion people worldwide already supplement their diet with insects. According to the UN, wasps, beetles, and other insects are currently “underutilized” as food for people and livestock.

The concept of entomophagy, which involves consuming insects, has garnered interest in Europe. A recent online survey was carried out in Poland, involving 419 participants. The findings indicate that the availability of processed insect products can enhance consumers’ inclination to purchase items based on insects. Among the respondents, nearly 60% of those who had previously tried insects, accounting for 15.51% of the total, rated the taste as either good or very good. The attributes of appearance, aroma, and taste emerged as significant sensory factors influencing the adoption of entomophagy.

PLANT OR DIE

But why even bother with alternative sources of protein at



all? Because just as humans are susceptible to heat, our food-based animals are also. In 2015, 17 million chickens died from the heat. Honeybees in Arizona's extreme heat are dying off as their hives are melting. Pigs, rabbits, and fish in China are dying while wheat fields are flooding. All placental mammals roughly share the same maximum internal temperature of blood that circulates through certain critical areas, such as the base of the brain, of about 37 to 38 degrees Celsius. Avians can suffer higher temperatures, up to 43 degrees Celsius. Anything above that, and the animals start dropping.

Our carbon emissions have had a direct impact on global temperatures. Approximately 10% of the greenhouse gas emissions in the United States stem from agricultural activities. Some estimates suggest that meat production contributes to nearly 60% of all greenhouse gas emissions within the realm of food production. This figure is due to the extensive land required for grazing animals, often acquired through deforestation, as well as vast expanses of land needed for cultivating their feed. It takes a larger biomass to sustain animals for the same caloric yield. For instance, producing one kilogram of wheat results in 2.5 kilograms of emitted greenhouse gasses. In contrast, a mere kilogram of beef contributes a staggering 70 kilograms of emis-

sions. And let's not forget about the substantial methane emissions cow digestion generates.

Elevated temperatures also place crops such as rice in jeopardy. In 2022, researchers discovered instances where nocturnal heat was causing harm to rice and other vulnerable crops. During nighttime, plants possess fewer mechanisms to protect themselves, presenting a significant menace to the world's food production network. "Given the mechanics of photosynthesis, plants require cooler temperatures during the night," explains Dr. Argelia Lorence, a professor specializing in metabolic engineering at Arkansas State University. In the context of wheat cultivated in fields, heightened stress from nighttime warmth resulted in diminished yields, reduced grain weight, and decreased starch and protein content.

So, what's to be done? A fundamental reevaluation of our food production methods is imperative to avert the looming threat of widespread famine. While Polish startups are actively engaged in this endeavor, their efforts require support and collaboration. It would be nice if we could avoid the dystopian future depicted in the 2013 movie *Snowpiercer*, in which train passengers are forced to consume gelatinous cubes made from cockroaches. However, when it comes down to it, the choice between a jellied cockroach bar and starvation isn't much of a choice, is it? ●