

FOOD TRANSITION

By Henk Hoogenkamp

The global food industry is undergoing a major transformation, and revolutionizing the way food is produced, creating an environment-friendly supply chain that takes no more than what planet Earth can give.

Driven by a combination of more health, environmental, and ethical awareness, consumer demand for plant protein formulated foods continues to grow. The looks of plant-based meat, bakery, snacks, and dairy products are set to become an enduring part of the

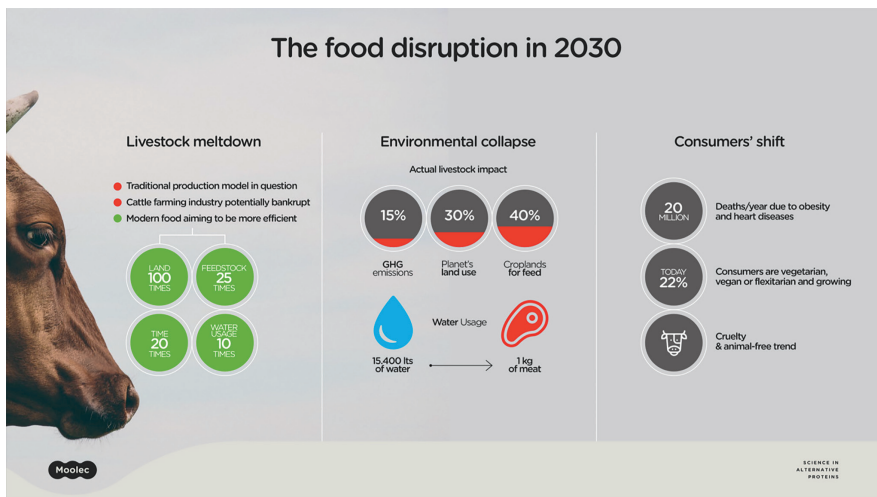
vegan or vegetarian foods as part of their planet-friendly and green-sustainable orientation.

Although plant protein can play a key role in reducing the ecological and environmental footprints of global food production, there is still a risk that the over-reliance on a few crops can lead to further reduction of biodiversity. Therefore, care should be taken, such that the drive for more plant protein consumption does not cause harm and issues such as deforestation and loss of wildlife and biodiversity.

on a platform of corporate sustainable environmentalism.

New food solutions are needed to fuel future populations' nutritional and emotional dietary desires. To accomplish these important tasks, a democratization of food technology and supply security needs to be implemented to harmonize the multiple solutions, of which cellular and molecular agriculture will become a main driver.

Ultimately, the solutions for plant-based meat alternatives, dairy alternatives, and cell-cultured food such as milk proteins and cultured meat must be egalitarian. In other words, these foods need to be healthy and allow the creation of delicious convenience foods that transcend cultures, socio-economic classes, and are affordable for the masses. For now, plant-based and fungi-based solutions take the front seat while fermented foods or facilitated micro community ingredients are catching up rapidly for use in many innovative foods, including possible functionality as a bio-preservative, to enhance the natural status for clean labels.



food landscape. In most developed countries, the market for plant-based proteins and alternative meat and milk continues to grow with double digit numbers. For both milk and meat alternatives, it is important to place these in the same supermarket aisles as the traditional products. This strategy significantly increases the likelihood that consumers choose these foods.

The plant-protein revolution is gaining strength with a rapidly increasing number of both legacy and startup companies offering

The global ecosystems are in need of a reimagining of food systems to operate within nature's boundaries. Conventional agriculture is strained to a point that it is unsustainable, especially that by 2050 the world will have run out of farmable land to feed the fast-rising population. To be compliant, food companies need to develop a vision of an economic system that prioritizes the biodiversity of nature's assets. Preferably, these objectives need to be accomplished in such a manner that capital, health, and affordability are harmonized

Zero Deforestation Global Economy

Due to agricultural expansion, deforestation and forest degradation continue to take place at alarming rates. Hence, it is imperative that new agricultural production methods are implemented without destroying valuable forest and wildlife areas. Ideally, whenever possible, reforestation should be made within the framework of

the transformative solutions for climate change, biodiversity, and the much-needed food security.

Legacy and startup companies alike -such as Nestle and Impossible Foods- have a mission to accomplish to end deforestation within the forest reserve and restore degraded forest and wildlife. These types of companies -as well as the premier plant protein companies such as Cargill, Bunge, and ADM - should work together to accomplish these lofty goals by promoting regenerative agriculture and strive to become resource-positive companies by sourcing only sustainable crops like soybeans in order to accelerate the transition to a net-zero global economy by 2050.

Furthermore, it is expected that effective diligence across supply chains will be introduced and that all food sold will be mandated as guaranteed deforestation-free. Supermarkets that are in the first line of consumer-defense are especially likely to drive these transitional changes needed to ensure food systems deliver affordable, healthy, and ecologically sustainable foods.

Challenging Times Prompt New Solutions

A fundamental shift in how food is produced is needed. This includes the practices of over 500 million smallholder farms and the consumption patterns of the global population, with special emphasis on the developed countries and the huge waste of valuable food. To minimize environmental degradation while still feeding some 10 billion people living on planet Earth by 2050, a drastic cut in consumption of meat, dairy, and eggs will be needed.

Although heavily contested, a string of scientific studies has shown that consumption of conventional dairy and meat must be reduced significantly in rich or affluent countries to tackle climate change, as well as to improve upon sustainability of the global supply chain.

The meat eaten today, in record consumed quantities, overwhelmingly comes from genetically-uniform, immunocompromised, and pharmaceutically treated animals, often stacked in confined spaces. For most consumers, the present and the future of animal farming are low on the list of priorities, mainly because of the lack of public understanding. However,



factory farming of animals should be top priority on the agenda to determine the limits of this huge industrially-powered supply chain.

Demand for animal-free alternatives is skyrocketing, with "plant meat" and "plant dairy" categories eating into the traditional animal-protein dominated markets. As an accelerator, the booming plant-based arena continues to attract both smaller-scale industries disrupting upstarts, as well as established contenders with huge names of brand awareness.

Consumers, especially the social media-savvy under-30 age groups, actively pursue the health benefits of a plant-based diet and switch to a flexitarian or vegetarian lifestyle. As a result, companies are prioritizing sustainable business principles in order not to disappoint the consumer expectations of transparency, including full disclosure of ingredient composition and its naturalness.

An increasing number of consumers living in affluent societies believe that vegetarian or vegan food choices are more sustainable than slaughtered food options such as beef, pork, and chicken. To put the latter into perspective: some 45 billion chickens are slaughtered every year and this number keeps rising significantly.

Consumer Demands

To keep up with the plant-based phenomenon and the shifting consumer attitudes from trend to food revolution status, the legacy brands are now forced to closely monitor market changes. This is especially the case as more consumers adapt to increased plant-based eating, though for diverse reasons, such as more protein in their diets, widespread goals for eating more healthfully, while feeling good about their proactive attitude for helping the environment.

Clearly, consumers in affluent countries see growing evidence that mainly plant-based dietary choices not only help manage weight, but also address underlying conditions like wellbeing and reduce the risk of degenerative diseases such as cancer, diabetes type 2, and cardiovascular disease.

It is evident that the younger consumers under the age of 30 are the early adopters of a vegetarian

or vegan dietary preference. In contrast, the consumers under the age of 50 are most likely to adopt a flexitarian-style diet as a meaningful compromise. These trends do seem to transcend both demographic and generational groups. For these groups of consumers, clean label and transparency is not a passing trend, it's a movement that is here to stay.

There are also subtle protein-consumption differences between men and women: women are mostly interested in protein for satiety and body-weight control, whereas men see protein nutrition in relation to their increased muscle strength, physical (sport) performance, and energy level.

Environmental & Human Health Degradation

The overriding question to be asked is if plant-based meat and milk beverage alternatives lead to sustained changed purchasing behaviors. For now, the answer is a resounding yes! It is also appropriate to ask if a vegetarian-based diet loaded with wheat, corn, soy, and rice is sustainable for long-lasting human health. After all, how wrong were the nutritional (pseudo) scientists and self-appointed gurus some 30

years ago when they were pushing the ultimate healthy diet high in carbohydrates and low in fat! A skyrocketing global obesity and diabetes type 2 epidemic is presently affecting both affluent and developing countries alike.

A more balanced approach on the ideal human nutrition guidelines will be needed. Perhaps it is now safe to conclude that optimal human health, in fact, clashes with the "health" of the planet Earth.

Since World War 2, advances in food, taste, and quantity have caused a degradation of nutritive quality. It takes more than just calories to nourish humans. Over the last 50 years, legacy food companies have continuously removed essential natural components from crops -especially roughage and fiber- to make food taste better. Most of these companies spend lots of energy in finding the bliss point -the stage of continually eating food. Quite a bit of compulsive eating resulted, and many people are on autopilot when eating these "great-tasting, empty-calorie" foods without guilt. This is good for marketing and sales, but bad for the nutritive status of a human body.

In the developing world of poor nations, diets high in dairy and meat

are expected to rise exponentially because of the growing number of people that will have the means to afford these much-beloved foods as the primary source of nutrition. However, the enormous increase expected in animal protein consumption in developing nations will mean a real setback in reducing greenhouse gas emissions.

Transformative Changes

The growing number of transformative changes with increasing meat and dairy consumption, as well as the rising demand for food and nutritional quality, will put additional pressure on the agricultural ecosystems. To meet world needs by 2050, an estimated 70 percent more food must be produced from less land and fewer inputs such as chemical pest control, less water, less fertilizer, and less or no antibiotics for raising slaughter animals. In addition, the inequities between developing and affluent societies must be solved in order to improve economic and societal imbalances.

Agricultural productivity rates have failed to keep up with global population growth. The overuse of priceless fresh water poses not only serious environmental hazards, but also a risk to social and political stability. In some global geographic regions, water scarcity may cause certain food imbalances or shortages in the next decade. In 2021 and beyond, water withdrawals will probably surpass sustainable supply and this discrepancy may only widen.

Although soy is an essential part of the global food supply, the high-protein crops have negative ecological and environmental impact if grown irresponsibly. There is no doubt that the explosive growth



of the soy crop has come at the expense of millions of hectares of grassland, forest, savannah, and wilderness taken away and converted to agriculture harvest land around the world. South America and Borneo have been particularly affected, destroying valuable ecosystems like the Amazon. Furthermore, Africa is catching up rapidly by destroying wildlife and habitat land, turning it into agricultural land and/or urbanization projects.

Between 2004 and 2020, the total amount of deforestation in Asia, Africa and South America totaled about 45 million hectares. These huge “green lungs” - ten times the size of the Netherlands- have mainly been converted into soybean and palm oil cultivation areas. These destructive actions cannot continue and a more meaningful solution to grow food is urgently needed.

Flexitarians for Plant Protein

The number of people who identify as flexitarians have greatly increased over the years. As more research is published on the benefits of a flexitarian diet, demand in the category will continue to grow. Most dieticians agree that incorporating one plant-based meal a day into the diet improves overall health.

Evidence is emerging that sustainability is an important issue for affluent young generations of consumers, and as such, it can be anticipated that pressure is mounting on food manufacturers to act accordingly. On their end, food retailers and quick service restaurants encourage or demand from their suppliers to step up the efforts to -ultimately- become carbon neutral by setting



net zero targets to reduce emissions in line with the Paris agreement. To accomplish these hefty goals, concrete actions are needed in transforming the global food system by addressing issues such as biodiversity, transparency, climate smart food production, sustainability, food waste, plastic reduction, and extended shelf life of perishable vegetables and fruits while preserving their “naturalness”.

The consumer landscape is changing rather quickly, and driving change in areas such as clean and green labels, natural, recognizable, and pronounceable ingredients. This powerful group of consumers is looking for unique meals or snack foods with a natural and clean label, with less or no preparation time or instant gratification. However, they also want foods to fit a holistic wellness that is perceived as foundationally nutritious. Differentiating lifestyle foods for specific consumer segments is becoming the new normal.

It is expected that the young generations will adjust their diet and include more sustainable food choices, including embracing the plant-forward movement. Plants will be playing a meatier role, and not just for vegetarian

alternatives. Consumers adopting flexitarian lifestyles are open to meat mimicking texture and flavor expectations. It is important to know that consumers are steadfast in their expectations and that repeat purchases of plant-based meat brands depend on meeting or exceeding these expectations.

A Different Food Outlook

The younger consumers prefer less processed food and likes menu components that are made-to-order or can be personalized or customized. These groups care about vastly different issues and are receptive to a new set of marketing messages. Looking at it from a different perspective, more than half of food and beverage consumption now occurs when consumers are alone, not to mention the fact that single person households in affluent societies will reach about 30 percent in 2021. The trend of eating solo will grow in the years ahead, which will ultimately impact EU and UK consumption patterns as well.

Many young consumers clearly have a different mindset when it comes to eating meat as their prime source of protein. This trend will pick up further speed as more consumers replace meat

with plant protein formulated alternatives, including plant-based meat alternatives, plant milk, and hybrid foods in which meat or dairy is either eliminated or used as a component rather than a dominant source.

Eating meat is deeply rooted in most societal cultures. As people grow richer, they (usually) increase meat consumption. This is especially true in developing countries rapidly catching to a western diet. Meat is perceived as nutritious and contains significantly more protein than plants. Even if all of that is true, there is an unmistakable trend to eat “meat” made directly from plants, rather than indirectly via an animal’s metabolism.

These formulated plant-meat and plant-milk products are slowly inching up to the organoleptic quality of their animal equivalent. These plant-based foods are a vegetarian approach for consumers who are not exactly into vegan lifestyle, but simply want to feel good about contributing to a more sustainable food production and worrying less about their health and wellbeing. Especially young girls going through puberty cite concern about animal welfare as one of the main reasons to look for alternative sources of protein.

As a result, it is safe to assume that protein from plants will become the leading food trend of the next decade. Plant formulated food can ideally be teamed up with wellness, health, and “natural convenience”. Plant protein also bodes well for lifestyle prowess and environmental responsibility.

Observational Proof

Dietary-induced health benefits of food can usually be discussed only

when looking at large populations. There is little doubt that food and health are hotly debated talking points that certainly seem to add to public consternation over dietary advice, which appears to change every few years.

Dietary reversals can be compared to a revolving door -- no wonder consumers are easily confused about what and what not to believe. Just mention the words -protein, salt, carbohydrates, and fats- and the conversation clearly goes nowhere.

Moreover, there is also a growing awareness about the sustainability of monoculture and environmental degradation caused by livestock production, which tends to have an outsized climate footprint partly because of all the land needed to harvest animal feed, and raise cattle and farm pigs, and quickly breed chickens. It is estimated that on average, beef has about five times the climate impact of chicken or pork, calculated per kilo net protein contribution to the human diet; add to that the cow’s methane emissions - a very potent greenhouse gas. More than 90 percent of the corporate dairy industries’ emissions are produced by the cows themselves, mostly in the form of methane. Unfortunately, little public pressure currently exists to force large legacy food, dairy, and meat companies to become proactive and transparent as to how they plan to tackle the reduction of greenhouse gas emissions.

Shifts in meat consumption occur in both developed and developing markets. The US and some EU countries have a negative growth (-1 percent) as poultry wins shares of the consumers’ stomachs at the expense of beef and pork,

except for China. Some of the declines in meat consumption are not only due to health concerns, religious and sustainability issues, but also to consumers embracing or adopting a different diet and lifestyle.

It is noteworthy that flexitarians who regularly enjoy a “veggie” meat alternative at home, will often choose to eat meat when dining out. Perhaps supported by the COVID-19 pandemic, consumers’ relationship with meat in their diets is changing. There is a subtle shift in consumers’ perceptions of the effect of meat on nutritional and health properties. Although it is true that affluent consumers are increasingly aware of the importance of high-quality dietary protein, they often look away from meat, and instead, prefer non-meat foods as their first choice. This development should set off an alarm for the meat industry in the Western world. In contrast, growing meat consumption in developing countries and emerging markets will push the global market to a volume growth of 2 percent in 2021. Meanwhile, poultry has emerged as the most popular meat protein in the world, increasing by 4 percent volume growth.

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