

CREATING A CONSUMER MARKET FOR NATURE-POSITIVE FOODS — COMPREHENSIVE FOOD DESIGN IS ESSENTIAL —

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SUMMARY

- The term 'Nature Positive' is attracting increasing attention both nationally and internationally. Companies are being asked to assess and disclose the extent to which their business activities depend on nature, as well as the impacts and risks associated with biodiversity.
- There is an inseparable relationship between biodiversity loss and food-related industries. Some players in the food sector have started to view the transition to a nature-positive economy that creates mutually beneficial relationships for nature, people, and businesses as a business opportunity.
- Creating new food consumer markets, which is important when identifying business opportunities, requires comprehensive food design, including not only products but also services that resonate with people's values.

1. NATURE-POSITIVE INITIATIVES GAINING MOMENTUM

The international community begins to steer a nature-positive course

The term 'nature positive' means halting the loss of biodiversity and putting nature back on the path to recovery. The 15th Conference of the Parties to the UN Convention on Biological Diversity (COP15), held in December 2022, adopted the Kunming-Montreal Global Biodiversity Framework (GBF), which incorporates the nature-positive concept. The GBF sets 23 global action targets aimed at achieving nature positivity by 2030. In particular, targets 15 and 16, which are concerned with how business and consumption activities should be conducted toward resolving issues, clearly state that companies are required to assess and disclose their dependence on and impact on biodiversity, and that consumers should be provided with the necessary information to promote sustainable consumption (Figure 1).

In order to promote agile and effective implementation of the GBF, the establishment of the Alliance on Nature Positive Economy was agreed upon at the G7 Ministers' Meeting on Climate, Energy and Environment held in Sapporo in April 2023. The primary focus of activity in the first year will be to develop and share case studies of public and private sector innovations, including technologies and business models that support the nature-positive economy; and the secondary focus will be to work with companies to enhance the disclosure of

information in collaboration with the Task Force on Nature-related Financial Disclosures (TNFD)¹ and other relevant international organizations^{2 3}.

Figure 1: Overview of the Kunming-Montreal Global Biodiversity Framework

(The vision, mission and targets 15 & 16)

2050 Vision: A world living in harmony with nature

2030 Mission: To take urgent action to halt and reverse biodiversity loss to put nature on a path to recovery

2030 Action Targets ^(note)

Target 15

Take legal, administrative or policy measures to encourage and enable business, and in particular to ensure that large and transnational companies and financial institutions take the following actions (a) to (c) in order to progressively reduce negative impacts on biodiversity, increase positive impacts, reduce biodiversity-related risks to business and financial institutions, and promote actions to ensure sustainable patterns of production.

- (a) Regularly monitor, assess, and transparently disclose their risks, dependencies and impacts on biodiversity, including with requirements for all large as well as transnational companies and financial institutions along their operations, supply and value chains, and portfolios;
- (b) Provide information needed to consumers to promote sustainable consumption patterns;
- (c) Report on compliance with access and benefit-sharing regulations and measures, as applicable.

Target 16

Ensure that people are encouraged and enabled to make sustainable consumption choices, including by establishing supportive policy, legislative or regulatory frameworks, improving education and access to relevant and accurate information and alternatives, and by 2030, reduce the global footprint of consumption in an equitable manner, including through halving global food waste, significantly reducing overconsumption and substantially reducing waste generation, in order for all people to live well in harmony with Mother Earth.

Note: The GBF sets 23 targets, organized into three groups: 1. Reducing threats to biodiversity (targets 1-8); 2. Meeting people's needs through sustainable use and benefit sharing (targets 9-13); and 3. Tools and solutions for implementation and mainstreaming (targets 14-23).

Source: Excerpt from Kunming-Montreal Biodiversity Framework
https://www.biodic.go.jp/biodiversity/about/treaty/files/kmgbf_en.pdf

Domestic activity is also accelerating

In Japan, there have been increased activities to support corporate nature-positive efforts, as represented by the launch of the Finance Alliance for Nature Positive Solutions at the end of February 2023 by Sumitomo Mitsui Financial Group, MS&AD Insurance Group Holdings, the Development Bank of Japan, and Norinchukin Bank. In addition, the Ministry of the Environment plans to develop a tentatively named Strategy for Transitioning to a Nature Positive Economy by the end of FY2023.

¹ The Taskforce on Nature-related Financial Disclosures (TNFD) is an international initiative launched in June 2021 by the United Nations Environment Programme Finance Initiative (UNEP FI), the United Nations Development Programme (UNDP), the World Wide Fund for Nature (WWF) and Global Canopy (a British environmental NGO) to develop and provide a framework for disclosure related to natural capital and biodiversity. As with the Task Force on Climate-related Financial Disclosures (TCFD), the TNFD asks companies to disclose their 'governance', 'strategy', 'risk management', and 'indicators and targets'. However, since unlike climate-related risks and opportunities, the evaluation indicators and target values of those related to nature differ by location, the TNFD proposes the 'LEAP approach' (Locate: locate the business's interface with nature; Evaluate: evaluate dependencies and impacts; Assess: assess risks and opportunities; Prepare: prepare disclosures). A fourth iteration of the framework was released in March 2023, and the final version is set to be published in September.

² The Capitals Coalition, the Natural Capital Protocol, the International Standards of Accounting and Reporting, the International Sustainability Standards Board (ISSB), the Global Reporting Initiative (GRI), the UN Global Compact, etc.

³ Ministry of the Environment "Terms of Reference for the G7 Alliance on Nature Positive Economy (provisional Japanese translation)" (April 2023) (Referenced June 28, 2023, hereinafter the same)

2. THE RELATIONSHIP WITH THE FOOD SECTOR AND THE BUSINESS OPPORTUNITIES PRESENTED

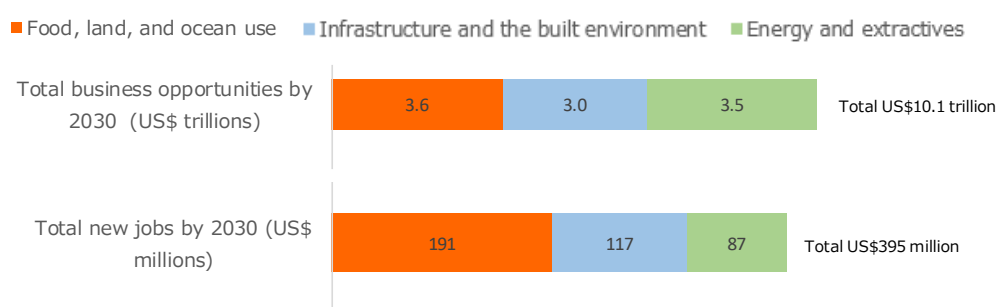
The close relationship between the food industry and biodiversity

Direct causes of biodiversity loss are considered to include changes in land use, the direct harvesting of organisms, and climate change⁴. Nature positivity and the food sector are inextricably linked, with studies showing that agriculture accounts for 80% of global land use change⁵. The value chain of food-related industries consists of production, transportation, processing, sales, consumption, and disposal of agricultural, forestry, and fishery products. There is no doubt that companies will be required to disclose and reduce the impact on the biodiversity of these processes more than before, leading to increased costs for existing businesses. However, the World Economic Forum's 2020 report, 'The Future Of Nature And Business', focuses on business activities and opportunities, and introduces a case study of smart farming being conducted in Indonesia using data and satellite imagery to improve average crop yields while reducing inputs of agricultural materials as an example of a successful business with a positive impact on nature. The report also presents the example of a doubling of income from shellfish, oysters, and other aquaculture products in Vietnam following the restoration of mangroves that were in danger of disappearing.

New business opportunities

The report suggests that the transition to a nature-positive economy that creates mutually beneficial relationships for nature, people, and businesses could generate approximately US\$10 trillion in value and 400 million new jobs by 2030, of which US\$3.6 trillion would come from the 'food, land, and ocean use' sector (Figure 2). Opportunities in this sector include alternative products such as organic foods and meat substitutes, diverse food markets, including vegetables, fruits, nuts, and seeds, reduction and utilization of food waste, and direct agricultural e-commerce (Figure 3). Many of these business opportunities are closely related to 'carbon neutrality' and the 'circular economy', concepts which are leading the way in combating climate change, suggesting that along with the 'nature-positive' concept, these three international sustainability themes are interrelated.

Figure 2: Business opportunities and new job creation associated with the transition to a nature-positive economy



Source: Cited from World Economic Forum (2020) "New Nature Economy Report II: The Future of Nature and Business"

⁴ According to the Global Assessment Report on Biodiversity and Ecosystem Services published in 2019 by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the direct causes of biodiversity loss include changes in land and ocean use, direct harvesting of organisms, climate change, pollution, and invasive non-native species.

⁵ Benton, Tim et al., 2021 "Food system impacts on biodiversity loss" Chatham House, p.16

Figure 3: Business opportunities associated with the transition to a nature-positive economy (food, land, and ocean use sector)

■ : Closely related to carbon neutrality ■ : Closely related to the circular economy

Transition	Area of opportunity	Overview	Business opportunities by 2030* (US\$ billion)
Ecosystem restoration and avoided land and ocean use expansion	1) Eco-tourism	Sustainable growth opportunities in the eco-tourism market.	290
	2) Natural climate solutions	(1) reforestation, (2) peatland regeneration, (3) avoidance of forest conversion, (4) avoidance of grassland conversion, and (5) avoidance of impacts on peatlands will increase carbon sequestration and reduce carbon costs.	85
	3) Restoration of degraded land	Restoring degraded agricultural soils and avoiding soil degradation will increase carbon sequestration and reduce carbon costs.	75
Productive and regenerative agriculture	4) Organic foods & beverages	Market growth opportunities due to sustained consumer demand for and increased supply of organic foods and beverages.	475
	5) Technology for large farms	Technological innovations reduce the area of farmland required for a given yield, thereby reducing land costs.	195
	6) Bio-innovation	The market for crop breeding and fertilization technologies using agricultural biotech and other technologies will expand with regulatory approvals and increased consumer acceptance.	125
	7) Technology for small farms	Technological innovations reduce the area of farmland required for a given yield, thereby reducing land costs.	110
	8) Micro irrigation	Micro-irrigation increases water use efficiency and reduces water use costs.	90
	9) Grazing intensification	Growth opportunities in the animal health diagnostic technology market and other markets through improved access to small farmers, etc.	65
	10) Sustainable pesticides and fertilizers	The market for bio-pesticides, bio-fertilizers, and organic fertilizers is expanding. Reduced fertilizer use avoids nitrogen loading and reduces carbon costs.	105
	11) Agroforestry	Carbon sequestration through the use of windbreaks, open cultivation, etc. will reduce carbon costs.	20
	Healthy and productive oceans	12) Sustainable aquaculture	Growth opportunities in the aquaculture market due to improved aquaculture methods and growing consumer demand (primarily in China) for higher value aquaculture products.
13) Natural fishery management		Reduces natural fishery losses through resource management-oriented fisheries and policy interventions.	40
14) Bivalve production		Growth opportunities from sustained demand growth and restoration of coastal wetlands.	15
Sustainable management of forests	15) Sustainable forestry	Increased revenue from forest area certified for sustainable forest management (SFM).	165
	16) Non-timber forest products	Growth opportunities in the market for herbal medicines and extracts.	65
Planet compatible consumption	17) Reduction in food waste at point of consumption	Reducing food waste in homes, food service, and food retail reduces waste disposal costs.	380
	18) Diversified fruit and vegetables	The market will expand due to an increase in the overall global intake of fruits and vegetables.	310
	19) Circular economy in textiles	The market will expand as the recycling rate of textiles increases.	130
	20) Meat substitutes	The market will expand due to lowering of production costs and increased efforts to differentiate products.	85
	21) Plant-based dairy alternatives	The market will expand due to lower production costs, increased protein raw materials, and product diversification.	70
	22) Nuts and seeds	The market will expand due to an increase in the standard intake of nuts and seeds worldwide.	60
	23) Food waste utilization	Increased biogas production from utilization of agricultural waste. Reduced disposal costs by composting inedible food material and avoiding landfill disposal.	15
Transparent and sustainable supply chains	24) Reduction of food waste in the supply chain	Reducing food waste in the supply chain following crop harvesting will reduce waste disposal costs.	365
	25) Farm to Fork model	Growth opportunities in the e-commerce market for agricultural produce where consumers purchase produce directly from farmers online.	65
	26) Urban farming	Business opportunities through the production of agricultural products in urban areas.	40
	27) Certified sustainable foods	Growth opportunities in the certified product market for major commodities driving deforestation (palm oil, soybeans, cocoa, coffee).	20
	28) Timber supply chain technology	Business opportunities through the application of fingerprint certification and DNA mapping technology in the timber supply chain.	20

*Market scale or cost savings

Source: Compiled by MGSSI based on World Economic Forum (2020) "New Nature Economy Report II: The Future of Nature and Business" p.42, AlphaBeta (2020), "Methodological note to the new nature economy report II: THE FUTURE OF NATURE AND BUSINESS" pp.15-35, Ministry of the Environment publication "Toward realization of a nature-positive economy" (March 2023) (Japanese), and other sources.

Toward a change in corporate behavior

Reflecting these possibilities, as of June 2023, more than 1,400 companies worldwide (with combined sales of more than US\$5 trillion) have signed a 'Call to Action' calling for corporate action to protect and restore nature organized by Business for Nature⁶, an initiative of international organizations such as the World Wildlife Fund for Nature and the World Economic Forum⁷. Business for Nature, the World Economic Forum, and the World Business Council for Sustainable Development (WBCSD)⁸ plan to release a report in September 2023 outlining the priority actions that should be taken by several industries.

3. RELATED FOOD MARKET TRENDS AND MOVEMENT TOWARD SELECTION OF NEW RAW MATERIALS

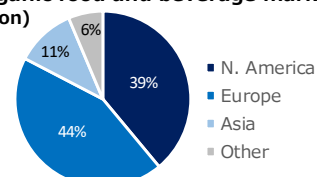
Organic Food Market Expanding in Europe and the US

Among the areas of opportunity listed in the previous section, organic food is already an existing market (Figure 3-4). According to IFOAM⁹, an international organic farming organization, the global organic food and beverage retail market doubled in size between 2011 and 2021, with North America and Europe accounting for more than 80% of this growth (Figure 4). While government and corporate initiatives and growing consumer awareness are driving this trend, it is also underway in Asia: organic farmland and consumption are growing in China, which is now the world's fourth-largest consumer market.

Large appetite for organic food in Denmark and Switzerland

Denmark, where sales of organic products account for approximately 13% of all food and beverage sales, was the first country in the world to introduce regulations for organic production in 1987. As a result, organic milk, for example, which accounted for less than 1% of the domestic market in 1988, now accounts for more than 30% of the market, and more than 30% of organic dairy products from major dairy manufacturers are exported¹⁰. In another initiative, the government introduced the Organic Cuisine Label (Figure 5) in 2009 to increase the use of organic ingredients in the food service industry, and since its introduction, the market share of organic food has continued to grow.

Figure 4: Global organic food and beverage market (2021)
(Share by region)



(Top 15 countries)

Country	Retail sales (€ millions)	Organic share (%)	Per- capita(€)	Note
US	48,618	6.0	146	
Germany	15,870	7.0	191	
France	12,659	6.6	187	
China	11,319	-	8	
Canada	5,284	3.3	138	
Italy	3,943	3.4	67	
Switzerland	3,705	10.9	425	
UK	3,461	-	52	
Sweden	2,764	8.9	266	
Spain	2,528	2.5	53	1
Austria	2,397	11.6	368	
Denmark	2,240	13.0	384	
Australia	1,694	-	66	
Japan	1,419	-	11	2
Netherlands	1,374	3.3	79	
Others (33)	5,570	-	-	
Total (48)	124,845	6.0	146	

Note 1: 2020 value. Note 2: 2018 value

Source: Compiled by MGSSI based on Research Institute of Organic Agriculture FIBL/IFOAM Organics International "The World of Organic Agriculture Statistics and Emerging Trends 2023"

⁶ A global coalition launched in July 2019 by 13 international organizations, it currently works with more than 80 institutions.

⁷ Business for Nature website: <https://www.businessfornature.org/call-to-action>

⁸ An international economic organization founded in 1995 to address issues related to sustainability. It currently has a membership of over 200 major companies, and works to compile and disseminate proposals from the business community in cooperation with governments, NGOs, and international organizations in various countries.

⁹ Founded in France in 1972, IFOAM is currently headquartered in Germany. It has more than 700 member organizations in over 100 countries.

¹⁰ Food Nation Denmark, 'A Vision and a Mindset in the Danish Organic Food Cluster', p. 8.

Figure 5: Danish Organic food label (left) and Organic Cuisine Label for restaurants (right)



* Available in three versions depending on the amount of organic ingredients

Note: The national certification label, which consists of “Ø”, the initial letter of the Danish word for organic, combined with a crown symbolizing the royal family, is widely recognized by Danish consumers.

Source: ORGANIC DENMARK website <https://www.organicdenmark.com/blog/25-years-with-the-danish-organic-label>

Royal Danish Embassy, Japan website https://denmarkfood.jp/case/organic_cuisine_label-increas-market-share/ (accessed June 3, 2023)

Switzerland, known for having the highest per capita consumption of organic food in the world, has been strategically promoting the production of high-value agricultural products through organic farming due to the limited land suitable for farming. In addition to appeals to consumers by organizations promoting organic farming, Swiss retail giants such as Coop and Migros are actively handling organic food products, making them more accessible to consumers and increasing their sales volume.

Toward selecting nature-positive food materials

As countries transition to a nature-positive economy, the market for a variety of vegetables, fruits, meat substitutes, seeds, and nuts is expected to expand in the future (Figure 3-18, 20-23). To this end, there is a need to restructure the way processed food products are designed. The food design process includes designing product concepts, selecting raw materials, and packaging. With respect to the selection of raw materials, the Ellen MacArthur Foundation, a UK-based organization that promotes the circular economy, has identified (1) ingredients grown using regenerative and other farming methods that have a positive impact on nature¹¹, (2) ingredients that have a low negative impact on nature, (3) ingredients obtained from upcycling foods and their by-products that are discarded¹², and (4) a greater diversity of animal and plant species as key materials for use by the year 2030¹³. Moves toward the production of such raw materials are gaining momentum, and some examples of start-up initiatives in this area are shown in Figure 6.

Figure 6: Startups developing raw materials required for nature-positive food design

Brand name (Location)	Established	Sector*	Business overview	Total funding (US\$ millions)	Funding round
NuCicer (US)	2019	③④	•Developed a non-GMO chickpea with extremely high protein content. The high protein content is said to reduce the energy required for protein production and the environmental impact.	11.5	SEED
Agrain (Denmark)	2018	②④	• Uses the malt dregs (100% organic malt) that would otherwise be discarded by beer and whisky producers to produce confectioneries, granola, and other products. 100g of Agrain’s Supergrain flour contains 20g of protein and 50g of dietary fiber.	2.29	Early Stage VC
Comet Bio (Canada)	2009	②④	•Produces health food ingredients from agricultural waste, including the arabinoxylan dietary fiber Arrabina, and the syrup substitute Sweeterra.	-	
Paragon Pure (US)	2019	②④	•Produces food additives by upcycling food ingredients. Developed the alternative fat olé-pbm using rice-bran oil, flavors, etc.	3.98	SEED
Minus Coffee (US)	2020	②④	•Produces coffee substitute beverages by roasting, fermenting and extracting chicory root, sunflower seeds, lentils, locust beans, etc. instead of coffee beans.	4.5	SEED
Insect Feed Technologies (Singapore)	2020	②③④	•Produces pet protein, fishery feed, organic fertilizer, and other products from the Black Soldier Fly, an edible insect, by upcycling organic food waste fed to the insect.	0.91	SEED
Greenfield Incorporated (US)	2018	①	•Developed a robotic weed control system aimed at eliminating chemicals from food production. Claims that its technology enables regenerative agriculture, which sequesters carbon in the soil.	5.1	SEED
Wildfarmed (UK)	2018	①	•Works with farmers to promote regenerative farming methods, improving farm biodiversity and soil conditions, and producing flour without the use of herbicides, fungicides, or insecticides for all crops. Produces and sells bread made from the flour grown.	2.84	SEED

* (1) Use of ingredients grown by regenerative farming methods, etc., (2) selection of ingredients with lower negative impacts, (3) use of food by-products that would otherwise be discarded, and (4) use of more diverse animal and plant varieties as ingredients.

Source: Compiled by MGSSI based on information from the Pitchbook, Crunchbase, and relevant corporate websites (as of June 2023)

¹¹ The Ellen MacArthur Foundation lists regenerative agriculture, restorative aquaculture, agroecology, organic, permaculture, agroforestry, and conservation agriculture as agricultural practices that have a positive impact on nature.

¹² The foundation believes that converting discarded food by-products into new materials can maximize the use of existing farmland and inputs and create new sources of income for farmers and businesses.

¹³ Ellen Macarthur Foundation (2021) “The big food redesign”, p.17

4. TOWARD THE CREATION OF NEW CONSUMER MARKETS

Policy support

The EU's Farm to Fork Strategy (May 2020) calls for at least 25% of all farmlands to be organic by 2030 and a shift to a plant-based diet containing more fruits and vegetables. In the US, the Department of Agriculture's Agriculture Innovation Agenda (February 2020) seeks to halve the environmental footprint of the country's agriculture industry by 2050. In Japan as well, the Ministry of Agriculture, Forestry and Fisheries has announced the Green Food System Strategy (May 2021) that seeks to increase the share of arable land devoted to organic farming to 25% by 2050, and to visualize the benefits of reducing environmental impact so that such efforts can be duly recognized by consumers. In China, the Ministry of Agriculture and Rural Areas has announced a policy of promoting green agriculture, including organic agriculture, in its 14th Five-Year Plan (March 2021), while China's Implementation Plan for Promoting Green Consumption (January 2022) seeks to promote environmentally friendly consumption. As you can see, efforts are underway in many countries in the area of food production related to business opportunities associated with the transition to a nature-positive economy and initiatives to increase the consumption of such products.

The growing role of retailers and manufacturers

In the case of organic food products mentioned above, in countries where such products are becoming increasingly popular, efforts by retailers, food service companies, and other companies that have direct points of contact with consumers are playing a major role, along with the introduction of easily recognizable labels and public education supported by government policies.

In the future, the creation of more nature-friendly foods and food markets with more diverse ingredients is expected, and various efforts will be needed to stimulate new consumption. For example, the British company Unilever's flagship brand Knorr has released 'Future 50 Foods' (Figure 7), proposing a diet that incorporates a wide variety of foods such as seeds and algae, and has launched a consumer campaign to promote the foods proposed in its report¹⁴. The company also sets the goal of having 25% of its brand incorporate these foods by 2025. In collaboration with the Behavioural Insights Team (BIT), a UK-based organization that specializes in the application of behavioral science, Knorr has also published the results of an experiment showing that influencers who promote a sustainable lifestyle, such as reducing food waste, have a significant impact on people's behavior¹⁵. In the future, in addition to retailers, direct communication from manufacturers and consumer-originated communication will likely play a major role in creating new markets.

The importance of appealing to values

In the case of organic food, many consumers are motivated to choose organic food because of food safety and health considerations¹⁶, and the market has grown through a combination of consumers' health and environmental values. Some studies show that people are willing to pay a higher premium for products that are

Figure 7: Future 50 Foods



Source:
<https://www.wwf.org.uk/sites/default/files/2019->
 (accessed June 5, 2023)

¹⁴ Knorr released 'Future 50 Foods' in collaboration with the WWF on February 19, 2019, and has been campaigning to mark February 19 every year as 'World Eat for Good Day'. The campaign informs people about various facts, including the fact that while there are more than 20,000 species of edible plants in the world, 75% of the world's food supply consists of 5 types of animals and 12 types of crops, and uses SNS and other means to inform people about foods that are good for the earth and people's health.

¹⁵ BIT website: <https://www.bi.team/blogs/how-can-influencers-encourage-sustainable-behaviours/>

¹⁶ Nunes, F.; Madureira, T.; Veiga, J. 2021. "The Organic Food Choice Pattern: Are Organic Consumers Becoming More Alike?"

good for health than for those that are good for the environment¹⁷. Going forward, it will be important to combine branding with added value that has a positive impact on both nature and people's health.

The value chain for many food products spans national and international markets. To achieve nature-positive outcomes both in Japan and abroad, it is crucial for related companies to collaborate and create comprehensive food design that goes beyond product design. This includes developing services that inspire behavioral changes by appealing to people's values.

¹⁷ World Economic Forum (2023) "Food Nature and Health Transitions", p.43