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Trends in the Food System

The Card Game

'Trends in the Food System – The Card Game' is an interactive dialogue session that can be used as an ice-breaker to connect and engage in conversations on different topics relevant to the food system.

Please read the instructions on how to print these cards for best results and find inspiration on how to engage using the trend cards set before hosting your own card game session.

If you would like some more background on the trends in the food system, read our report on trends which highlights the definition of trends, their drivers, and further inspiration on how to use the trends in an interactive setting.

Most importantly: enjoy, have fun and let us know if you have any comments, inspiration, feedback at info@fit4food2030.eu.

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Printing Instructions: For Best Results

Trends in the Food System – The Card Game

Please print the cards in the following format to have the trend description on the front page & option for notes on the back page:

- Portrait
- 2 cards (a.k.a pages) on one A4 page (sheet of paper)
- Front and back
- Pages 5-124 only

Print on 160 gram paper, if you want a sturdier sheet (check your printer manual whether the printer allows printing on such thick paper & whether you need to feed the paper through a different in-tray on the printer).

Once printed, use a paper cutter to cut the A4 pages in half which should result in two A5 pages each with a trend on the front of the page, and a note section at the back of the page.

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Inspiration for Use

Trends in the Food System – The Card Game

In small groups, each participant picks a trend of their choice:

- Explain why this trend is of importance to you: does it affect you personally or professionally, does it resonate with you for your own personal belief system?

Questions to initiate discussions:

- Do you see an aspect of this trend which affects all group participants in one way or the other in your lives?
- How does the trend affect the food and nutrition system?
- Is it a global/local; open/hidden trend?
- What (or who) has initiated the trend?
- What are drivers and barriers for this trend?
- In your opinion, what are the key actors that currently influence this trend (who creates/steers/pushes/prevent it)? And in the future?
- In your opinion, what are the key actors that are currently mostly affected by this trend? And in the future? Opt.: Can you name concrete activities of these key actors?
- Can you assess the time horizon (within the next few years, months, or next decade, trend short-living or sustainable) and indicate the niche or sector (e.g. certain groups of people, an industry sector, etc.) this trend influences the food and nutrition system in?

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Inspiration for Use

Trends in the Food System – The Card Game

Prepare some wall space separated into three sections & indicate:

- Positive outcome
- Negative outcome
- Do not know outcome OR ‘outcome is both positive and negative’

Let people choose a trend of their choice & pin it to one of the three wall spaces. Explain why they have chosen to pin the trend in the relevant wall space.

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Climate Change

Between 1880 and 2012, the average temperature of the global land and ocean surface increased by 0.85°C, the temperature in the arctic even by 2°C. In the northern hemisphere, the last 30 years are the warmest in the last 1400 years. Because of increasing CO_2 emissions and their strong, almost linear, relationship with the projected temperature change, further warming over the next few decades seems inevitable.

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Malnutrition

Combating malnutrition in all its forms is one of today's greatest global health challenges. Currently, about 45% of deaths among children under 5 years of age are linked to undernutrition. These mostly occur in low- and middle-income countries. More than 500 million people are expected to suffer from hunger and malnutrition in the less developed countries in 2030.

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Rise of Non-Communicable Diseases

Currently, 1.9 billion adults and 41 million children are overweight or obese. Overweight and obesity rates are rising quickly worldwide and lead to increases in non-communicable diseases (e.g. cardiovascular diseases, diabetes and cancer). Unhealthy and nutritionally poor diets are major risk factors.

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Urbanisation

In 2008, 50% of the world's population lived in cities. In 2030, about 60% of the global population will live in cities. In less developed countries, about 3.9 billion people will then populate urban areas. Although cities cover only 2% of the Earth's surface, they produce 80% of global economic output, 70% of global greenhouse gas emissions, and consume 75% of the global energy.

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Demographic Change

The world's population is expected to rise from 7 to 8.5 billion by 2030, and to 9.7 billion by 2050. The population will grow almost entirely in less developed countries, especially in Africa. In Europe and westernized countries, population figures will rise slowly or even fall. Population groups >60 years are projected to grow the fastest. People over 80 will account for around 10% of the world's population in 2050.

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Migration

Over the last decade the number of migrants has increased from 150 million to 214 million and is likely to triple by 2050 to 405 million. There is inward migration as well as outward migration. Inflow of young migrant workers will be a crucial factor to counteract ageing societies in most westernized countries.

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Scarcity of Natural Resources

The availability, accessibility and usability of natural resources are prerequisites for prospering economies including the agricultural sector. High-quality land and the availability of water and nutrients are the basis for food and renewable energy production. Yet, the quality of land suitable and available for agriculture is increasingly threatened by degradation due to over-exploitation, pollution, the impact of climate change, competition for land and shortage of available water.

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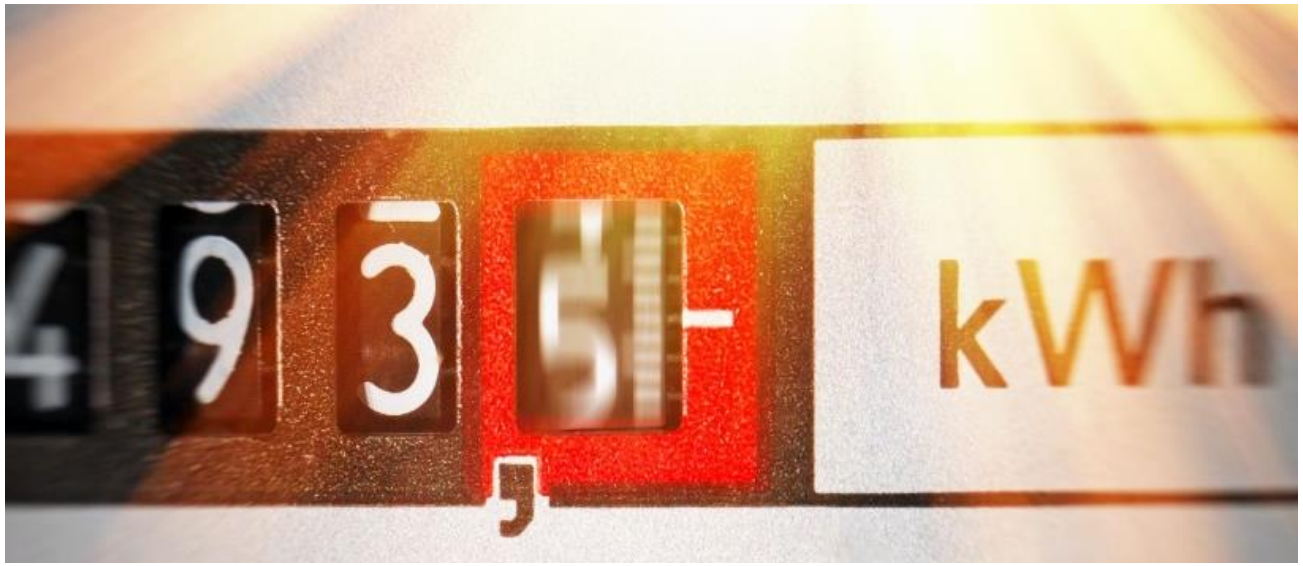
Rise in Energy Consumption



The global primary energy demand is expected to increase by 37% between 2012 and 2040. In 2040, the largest consumers will be industry (rise in energy demand by 40%), transportation and commercial and residential buildings.

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Industry 4.0 – Digitization in Food Production

The next production revolution will occur because of a confluence of technologies. These range from a variety of digital technologies (e.g. 3D printing, the Internet of Things – IoT, advanced robotics) and new materials (e.g. bio- or nano-based) to new processes (e.g. data-driven production, artificial intelligence, synthetic biology).

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Big Data Analysis

Big data analysis is expected to revolutionize the agricultural industry. Accurate crop predictions are possible by using sophisticated computer algorithms that analyze decades of weather and crop data. Big data are used to design chemically engineered seeds. Combinations of the internet, data analytics, improved sensor techniques and the use of drones for data gathering allow for agricultural automation that goes far beyond precision farming.

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Economic Globalisation

Advancing economic globalization is currently creating a multipolar global economy. The center of this global economy will be in Asia, rather than in western countries. This overall development will also stimulate the rise of a new global middle class.

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New and Game-Changing Digital Technologies in Agriculture

New technologies will have a central role given the magnitude of the challenges for food security in the coming decades. The development and application of new technologies is taking place in many areas of agriculture. The areas highlighted here focus on technological and digital aspects that have a strong disruptive potential, with significant impact in the next decade. This can be enabled by the development of new platform technologies.

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Alternatives to Conventional Pesticides

New products and strategies are being developed in agriculture and storage that use less or no conventional pesticides. Biopesticides and Integrated Pest Management strategies (IPM) have been suggested as viable solutions to sustainably replace conventional pesticides. Other approaches include tailor-made chemicals or “3D printing”, i.e. assembly of small molecules to custom chemicals.

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Changes in Farm Structures

Small-scale farmers and members of their families are gradually diversifying their sources of income and employment, and many of them are ready to leave the agricultural sector entirely. This ‘exit from agriculture’ has taken place, for the most part, gradually over generations while land holdings are consolidated to gain economies of scale. Farmers who remain in the sector change their practices, shifting from multiple crops to monoculture, and moving away from staples toward higher value foods and cash crops.

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Agricultural Pollution

Agriculture is a significant source of greenhouse gas emission and, due to excessive and sometimes improper use of fertilizers and pesticides, has led to a degradation of soil and water quality. Improper management of agricultural waste has contributed to local and regional air pollution. Measures that keep pollutants out of the air, water, soil, and food have helped to benefit both farmers and consumers at a time when citizens and governments around the world are seeking to ensure that agricultural development is sustainable.

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Biodiversity Loss

The biodiversity of natural eco-systems provides important, although largely unvalued, services (e.g. food provisioning, water purification, flood and drought control, nutrient cycling, and climate regulation) to both human populations and the environment. At a global level, as well as in most regions, biodiversity has been declining for decades. Human intervention in the biosphere is leading to a loss of biological diversity. If the destruction of ecosystems and related services will not be addressed sustainably, losses will be irreversible. Moreover, certain benefits from ecosystems might be lost completely.

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Transboundary Pests and Diseases

Food security is threatened by an alarming increase in the number of outbreaks of transboundary pests and diseases of plants and animals. These pests and diseases jeopardize food security and have broad economic, social and environmental impacts as they spread across national borders. The increase in zoonotic diseases running along with an increase in resistance to drugs, such as antibiotics, increase the threat to both humans and nature and thereby influence FNS.

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Organic Farming

A number of studies draw relations between soil and plant health, food crop nutritional quality, and human health and showed effects on nutrients, fat, vitamins, environment, and so on of organic farming. Recent evidence suggests that organically grown fruits and vegetables contain higher levels of phytochemicals, possibly linked to greater plant stress, rhizosphere microbial communities, and/or lower available nitrogen.

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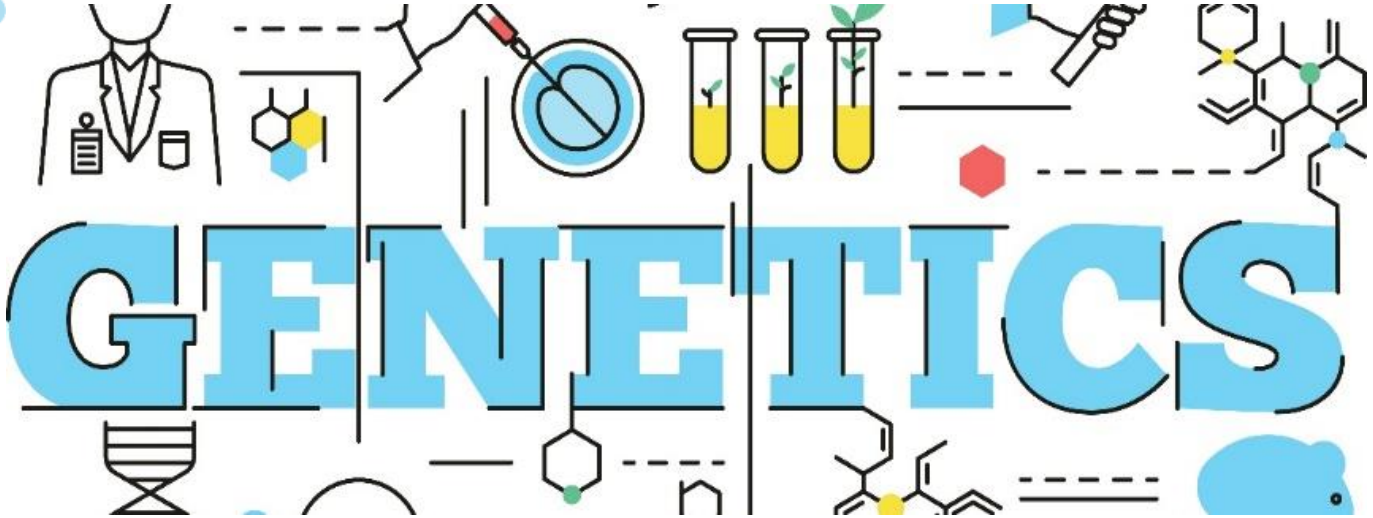
Genome Engineering



Advances in genome engineering offer immense potential for modern animal and plant breeding. New possibilities include building plant resistance to pests, diseases or environmental threats (e.g. draught), creating biopesticides, increasing throughput or prolonging shelf life. One of the most potential methods is the CRISPR-cas9 gene editing tool with unprecedented precision. Since the mid-1990s, the release of GMOs (genetically modified organisms) into the environment and the marketing of foods derived from GM (genetically modified) crops has resulted in a scientific and public debate.

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Bio-Fortification

Fortification is the practice of deliberately increasing the content of an essential micronutrient, i.e. vitamins and minerals (including trace elements) in a food, to improve the nutritional quality of the food supply and provide a public health benefit with minimal risk to health. Biofortification is the process by which the nutritional quality of food crops is improved through agronomic practices, conventional plant breeding, or modern biotechnology.

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Indoor Cultivation Systems

Indoor (urban) farming technologies involve agricultural production in (multi-storey) buildings. Systems such as hydroponics or aquaponics grow plants in soilless nutrient solutions. New technologies such as LED lights make production all year round possible and environmentally friendly. Further effect of these growing systems is the controlled conditions or the independence of access to soil.

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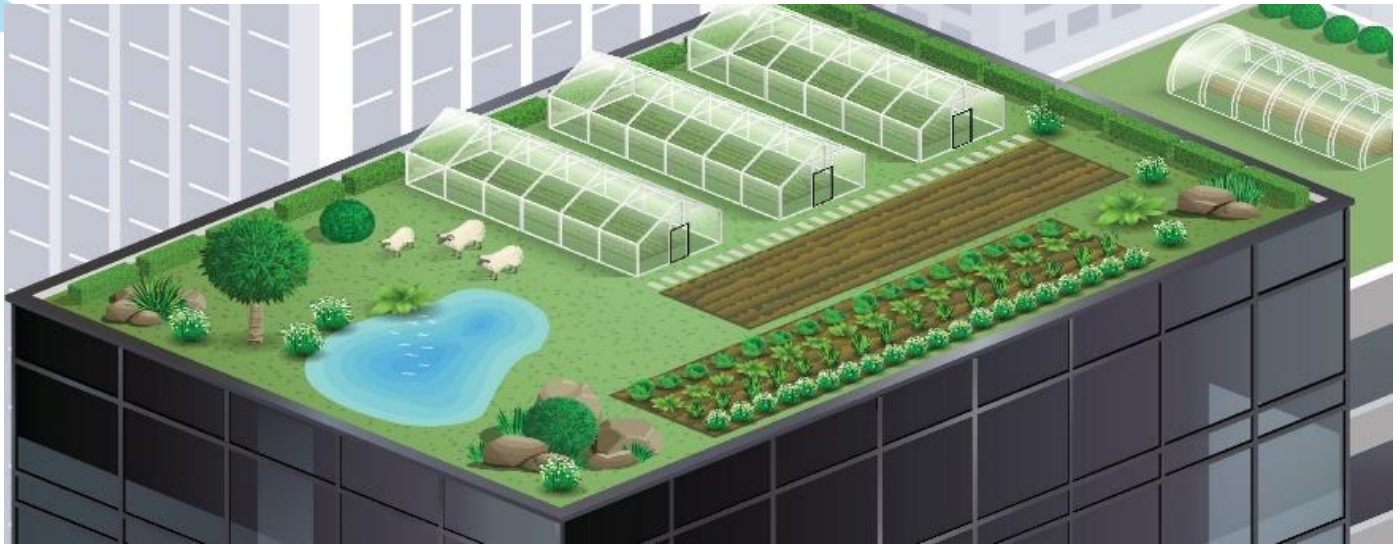
Urban Agriculture / Urban Farming



Urban agriculture can be defined as the growing of plants and the raising of animals within and around cities. The most striking feature of urban agriculture, which distinguishes it from rural agriculture, is that it is integrated into the urban economic and ecological system: urban agriculture is embedded in and interacting with the urban ecosystem.

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Food from the Sea

The ocean contains 97% of the planet's water. It provides seafood, which is the primary source of animal protein in the diets of approximately 1 billion people. According to the FAO, food supply will have to increase 60% by 2050 to meet the demands of a projected population of 9 billion. If sustainably managed, the ocean could contribute to food security and alleviate pressures on land based food production.

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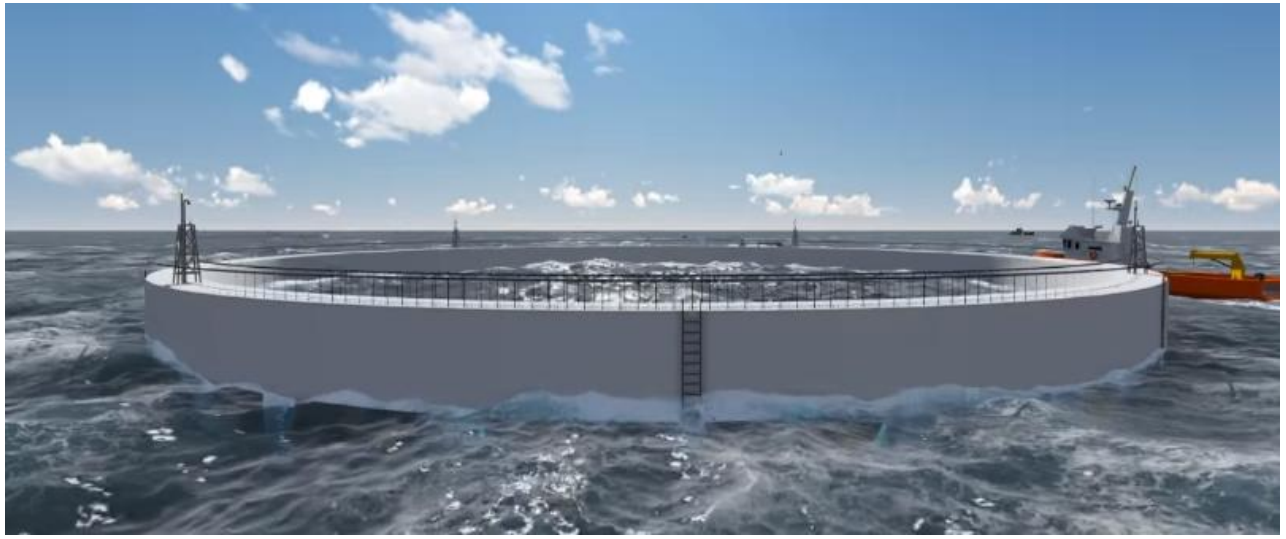
Closing the Loop in Aquaculture



The challenges that (finfish) aquaculture is facing has sparked interest for a gradual transition from open to (semi-) closed aquaculture facilities. Most challenges affecting the aquaculture sector can be addressed by fully-closed systems as there is a barrier between the cultivated organ-isms and the natural environment. These systems can either be land-based or marine, as long as there is no continuous water ex-change between the cultivation system and the natural environment. Although requiring significant investments, the transition from open to closed aquaculture has been demonstrated to be economically viable.

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Permaculture

Permaculture strives to design sustainable agricultural systems and human habitats that mimic the patterns and relationships found in natural ecosystems.

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Blockchain Technology for Secure Food Supply Chain

In an increasingly volatile market, the blockchain adds an extra level of security for the food industry. Companies who can utilize blockchains to instill transparency in their supply chains are well protected should another scandal hit the industry. Blockchain technology was developed as a decentralized ledger which records transactions and stores this information on a global network in a manner which prevents it being changed at a future point.

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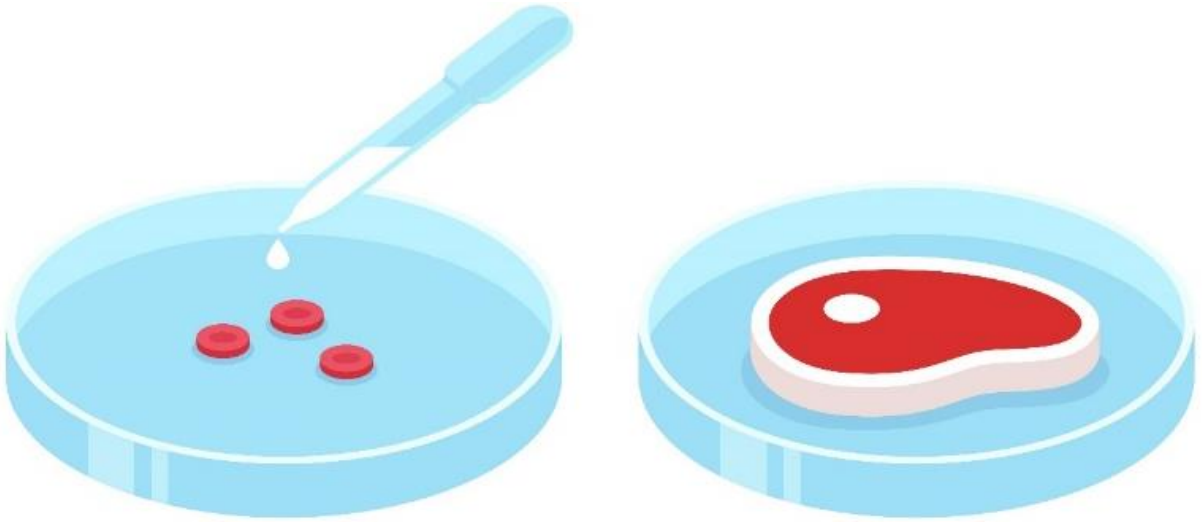
Cultured / In-Vitro Meat



Cultured, lab-grown or *in vitro* meat utilizes technology to produce meat from animal (stem) cells without killing the animal. As stem cells can be the source for pretty much every type of cell it might be possible to change the biochemical composition of meat to make it a healthier or specialized dietary product while also reducing concerns around animal welfare. Worldwide start-ups have already been formed to cultivate meat balls and other meat from animal (stem) cells since 2016.

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New Technologies in Food Production

New or novel food technologies (NFTs) are scientific and technological developments that enhance the way food is produced or processed, which may or may not result in differentiated – i.e. cheaper or healthier – products for consumers. Novel food technologies are used in all steps of food production from forming, emulation to extraction, separation, cooking or preservation.

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High / Ultra-Processed Food

A new classification for food categorizes food according to the extent of food processing rather than in terms of nutrient content. Ultra-processed food and drink products are regarded as convenient, safe, affordable and highly palatable. However, resent studies have linked a higher intake of ultra-processed foods with higher risks in cancer, obesity, hypertension or dyslipidaemia.

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Clean Eating / Transparent Labels

Using ‘Transparent Labels’ the food industry is communicating to the consumers that a product contains a certain ingredient or additive, or whether a product has been produced using ‘natural’ production methods (e.g. organic agriculture or minimally processed food). It is a consumer-driven movement, demanding a return to ‘real food’ and transparency through authenticity.

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Novel Food

Novel food has entered the food market in the last two decades. It is based on a number of recent innovations, such as new isolated food ingredients, micro-organisms or novel animal ingredients like insects or new production processes. Despite much interest in Western population due to their nutritional and environmental advantages, novel food products also have very high product failure rates.

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Natural Preservatives & Milder Processing Methods

Preservation of food is essential for prolonging shelf-life and ensuring food safety. Modern processing technologies aim at gentle preservation, a combination of preservative factors and their interaction and the use of natural rather than chemically synthetized preservatives. Reason behind it is the retention of food quality with high nutritional values for health.

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Alternative Protein Sources

Consumption of sufficient dietary protein is fundamental to muscle mass maintenance and overall health. However, the production of sufficient amounts of conventional animal-based protein to meet future global food demands represents a challenge. Edible insects, cultured meat and micro-algae have recently been proposed as alternative protein sources that may be produced in a more sustainable way and may contribute to ensuring global food security.

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Functional Foods incl. Pre- and Probiotics

Functional foods (including pro- and prebiotics) affect beneficially physiological target functions in the human body, beyond adequate nutritional effects, in a way relevant to an improved state of health and well-being and/or reduction of risk of disease. These health claims influence purchase decisions among consumers and drive the demand for the functional foods as they promote better health, increase longevity and prevent the onset of chronic diseases.

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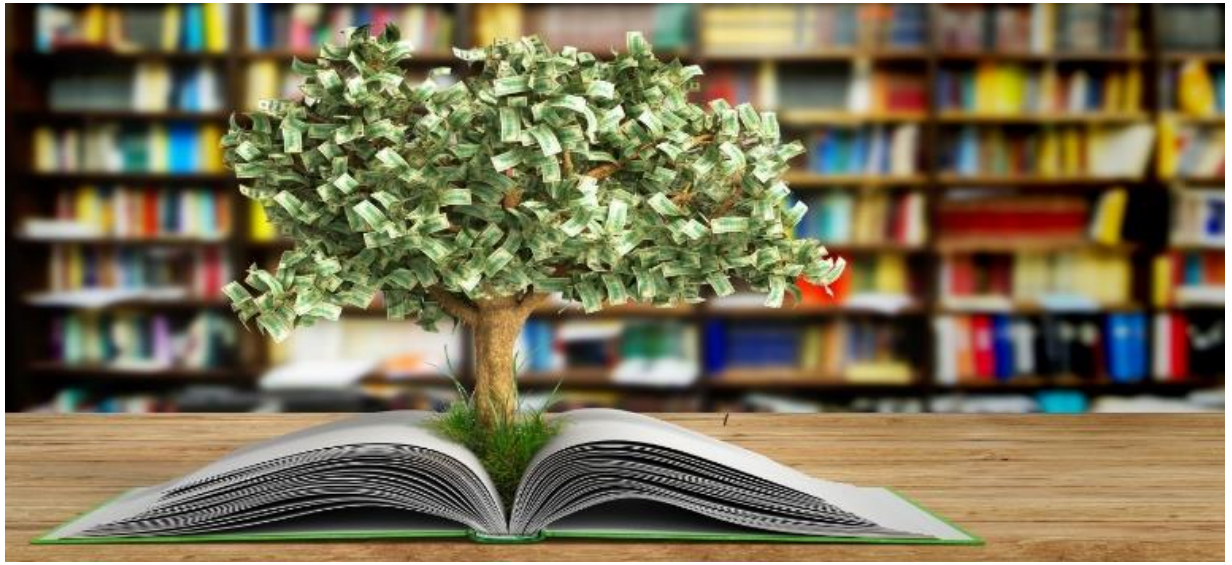
Health and Food Conciousness



Consumers increasingly begin to understand that everything they eat has an effect on their health and wellbeing. This understanding enables more deliberate food choices and leads to empowered consumers.

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Responsible Consumers

Consumers are increasingly interested in the growing history of the food and food miles, i.e. the distance food travels. Its past relates to the way it was grown, produced and transported within the food system. This knowledge empowers consumers to chose responsibly according to their own personal values.

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Special Diets Like Vegetarian, Vegan Or Low Carb

Special diets like Paleo, Detox, Slow carb etc. are on the rise worldwide. Among these vegetarian and vegan diets seem to be the most widespread and persisting. Reasons for this are an increased awareness of the positive effects of food on health and well being, changing values towards animals, growing consumer interest in ready-to-eat-food, and growing demand for food with higher safety standards.

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Destabilized Consumer Trust

Public attention to food safety and food fraud is increasing: *Escherichia coli* outbreaks, Fipronil eggs contamination, but also the horsemeat scandal have shaken consumer trust in food in the recent past. Some are actual contaminations and cause foodborne illnesses, others do not meet consumer ethics. Intentional adulteration of foods is getting more public attention and leading to mistrust of consumers.

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Fast and Convenient Food

In general, there is a trend towards fast and convenient food, which is often – but not necessarily – unhealthy and leads to high amounts of waste. It is accompanied by personal lifestyles that do not allow much time for the preparation and consumption of food.

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Low Prices, High Calories

Peoples' dietary styles are influenced by their living conditions and the socio-cultural environment. People with less money, lower educational level, insecure working conditions and poor living conditions are more likely to choose low price food with high fat and sugar contents which are seen as major cause of the high prevalence of non-communicable diseases.

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“Free-From” Products

‘Free-from’ products (which include a range of non-GMO, gluten free, lactose free, fat free, sugar free, histamine free food items) are on the rise. More consumers are interested in self-managing ingredients to control for food intolerances, or to follow specific dietary styles.

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Smart Personalized Food

In smart personalized nutrition customers are part of the production process and co-create their own food. Biomarkers and sensor technologies allow a range of new features to technically support the co-creation processes.

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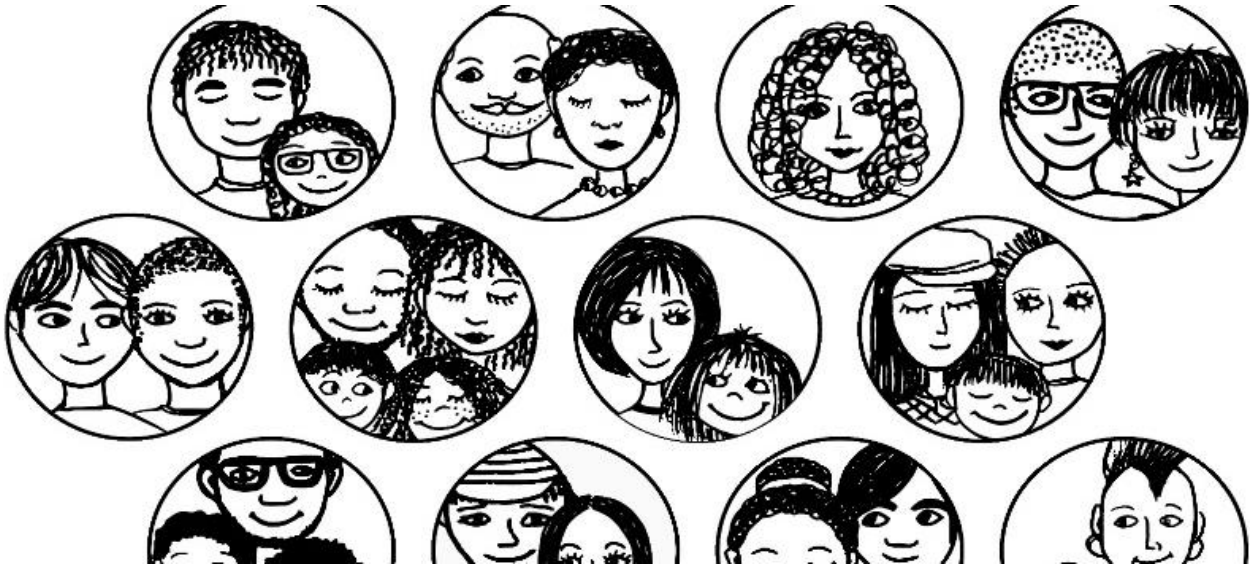
Changing Households and Food



The number of single-person households and people with different life styles is on the rise worldwide. This is also associated with distinctive food-related consumption behaviour.

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Globalisation of Diets

This trend includes the increased popularity of ethno foods (Japanese, Turkish, Egyptian, Mexican, African, Korean, etc., cuisines) as well as the increased availability of ingredients for diverse cuisines in local supermarkets. There is a link to migration, travel and global communication.

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Consumer Engagement

Consumers cannot be placed merely at the receiving end of the food supply system. They are not just customers who demand what is supplied, but they are self-organized actors pursuing their own interests according to their values and degree of information, thus driving the development of a future food supply system.

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Traditions and Do-It-Yourself

Getting more involved in cooking fits in with the current DIY (Do-it-Yourself) trend. Consumers show increasing interest for products that are perceived as more traditional and homemade, which is related to values like health, sustainability, authenticity, ethics, and emotional and social needs.

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Social Media and Food

Social media have changed the way we eat and what we eat. There is a trend towards food that is considered aesthetically pleasing: it has to be 'clickable and likable'. Internet has made new culinary worlds accessible and web-sites and blogs for recipes are replacing traditional cook books. People are also increasingly influenced in their food choices by bloggers and what they read online.

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Concentration in Food Retail Markets

Retailing is one of any economy's most visible activities. Retailing refers to the sale of goods or services from companies to individual end-consumers. The last 20 years have seen a number of important joint-ventures, mergers and acquisitions in the retail sector, either to enter into new markets, or to consolidate positions on domestic markets during a period marked by increased international competition as well as the emergence of e-commerce.

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New Shopping Behaviour

Food services are emerging that include personalized recipes, diets, delivery and ingredient customization in all possible combinations around people's lifestyles. Social use of technology is also affecting consumer behaviour. Time is a very important consideration when choosing what to eat and can counteract or even overrule nutrition and health factors if a choice needs to be made.

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Short Food Supply Chains

Short supply chains involve as few intermediaries as possible, connecting local suppliers with local consumers more directly compared to conventional (longer) supply chains.

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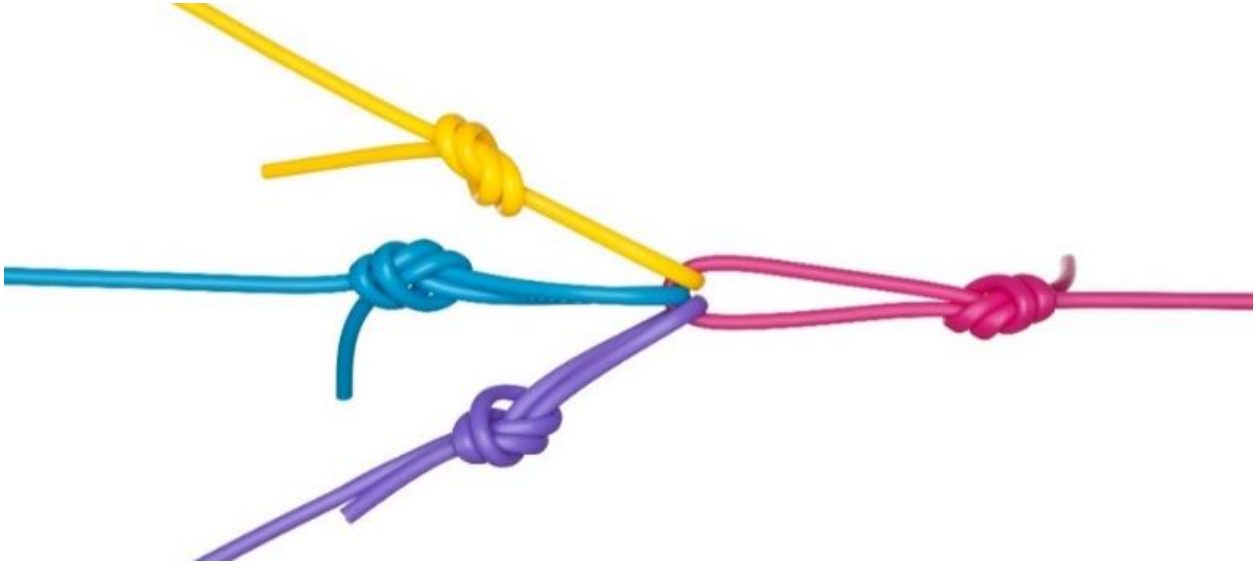
Chain Clustering along the Food Supply Chain



Across the food sector a significant horizontal and vertical restructuring is happening. Unprecedented consolidation runs along and across the seed, agro-chemical, fertilizer, animal genetics and farm machinery industries, while creating ever-bigger players in the processing and retail sectors. This consolidation along the food chain has made each node more reliant on a handful of suppliers, depriving their ability to choose what to grow, produce or to sell.

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Physical Internet (Logistic)

The concept of Physical Internet was introduced as a framework for Internet of Things in the context of transport of goods and logistics networks, i.e. uniquely identifiable objects receive a representation in a virtual world. 'Intelligent' containers store information about their content, but are also capable of dynamically optimizing transport flows. The goal of the Physical Internet is to use the principles of sending data packets through the digital internet in order to create more efficient and sustainable logistics.

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Biobased Packaging

Bioplastics are not just one single substance, they comprise of a whole family of materials with differing properties and applications. According to European Bioplastics, a plastic material is defined as a bioplastic if it is either bio-based, bio-degradable, or features both properties. There has been an increasing trend towards replacing conventional fossil-based plastics with bioplastics. Within the next years, global production capacity of bioplastics is expected to reach a level of 7.85 million tons in 2019.

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Packaging 4.0

Packaging 4.0 goes beyond active and intelligent packaging providing an interface to a rapidly evolving digital world, implementing Industry 4.0 concept into the food system. Packaging 4.0 allows digital connectivity and new functionality that also engages the consumer. Intelligent packaging solutions will communicate actively within the value chain, manufacturing, distribution and the consumer's home environment

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Reduction of Plastic Packaging

Plastic is an important and ubiquitous material but often the way it is used and discarded does not run along with the economic benefits of a circular and sustainable approach and harms the environment. The EU has recently published a vision for circular plastics economy. Regarding the food system responsible consumers ask for reduction of packaging – not only plastic – to avoid waste and environmental pollution, companies start rethinking pack-aging material taking sustainability into account.

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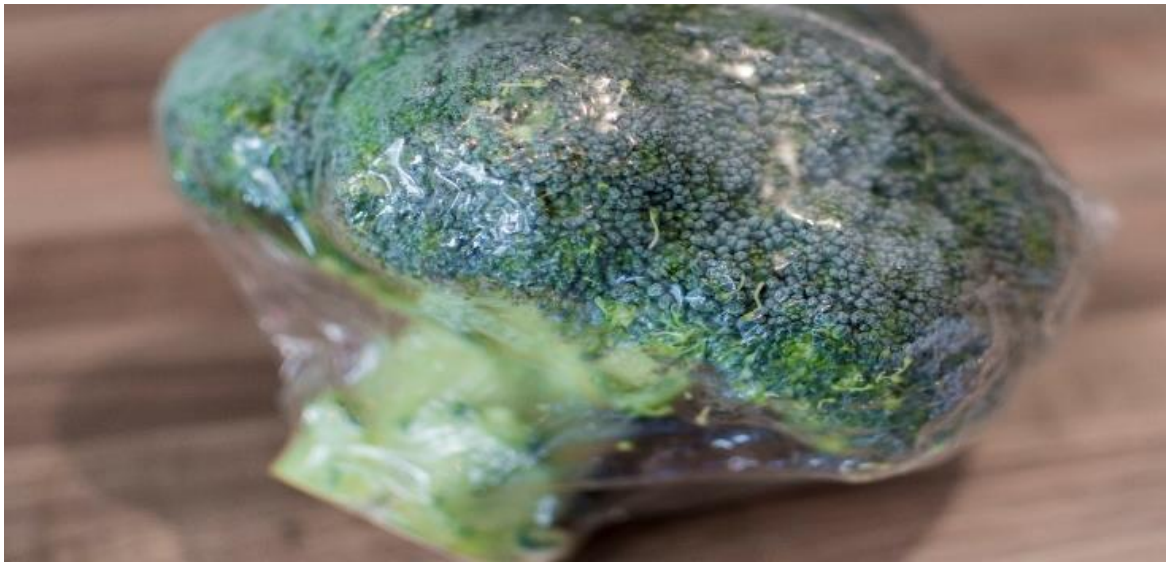
Packaging & Health



Advances in processing techniques, preservation, and packaging have enabled the food industry to consistently supply consumers with a wide array of healthy and fresh products all year round. Food packaging can improve food safety by reducing bacterial contamination, prolonging shelf life, ensuring convenience in distribution and handling. On the other hand food contact materials can transfer chemicals to food with partly unknown effects.

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Food Waste Recovery
Up-cycling / Waste Cooking

The FAO estimates that each year approximately one third of food produced for human consumption in the world is lost, degraded contaminated or wasted. A series of solutions may be implemented and are represented by avoidance and donation of edible fractions to social services or use to produce biofuels or biopolymers. A variety of (social and private) initiatives has evolved to use e.g. vegetables not fitting the standard, waste cooking or up-cycling of non-food waste.

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Women's Empowerment

Discrimination against women is still the most common form of social exclusion worldwide. Women encounter poorer educational opportunities than men, restricted access to certain fields of employment and barriers to holding political offices. Due to ongoing empowerment processes, women gain more power and control over their own lives and increasingly act as drivers of global transformations in areas such as education, poverty reduction, agriculture and urban development.

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Responsible Research and Innovation (RRI)

Responsible research and innovation anticipates and assesses potential implications and societal expectations with the aim to foster the design of inclusive and sustainable research and innovation. RRI often includes open science which aims at making scientific research accessible to all.

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Food Regulation

Alcohol, tobacco and nutrition containing high amounts of sugar, salt and fat and are considered as being among the highest risk factors for non-communicable diseases (NCDs). Over-consumption of sugar is a major cause for obesity, diabetes and several other NCDs. Several recommendations from WHO and lately also regulations in single countries are addressing these risk factors.

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