

Shaping the Future of Global Food Systems: A Scenarios Analysis

Highlights from the report

February 2017

Background and topic

Forces of change are reshaping the world's food systems

Major demographic shifts are increasing and changing global demand for food

Food Demand Is Growing

- A rapidly growing global population is expected to reach 9.5 billion people by 2050, increasing global food demand by 60%
- Most of the growth will come from developing markets, with Africa expected to double its population from 1 to 2 billion by 2050

Food Demand Is Changing

- Populations are becoming more urbanized, with 2.5 billion additional urban residents projected in Africa and Asia by 2050
- A rising urban middle class in developing markets will shift diets toward more processed foods, meat and dairy



These shifts drive new threats to our populations, systems and environment

Food Availability

- At current yield levels, we will be able to feed only half the world population by 2050
- 1.3B tons of food are lost or wasted annually

Market Volatility & Security

- Average food prices today are over 50% higher than 10 years ago and increasingly volatile due to market shocks from trade restrictions, extreme weather and commodity market fluctuations
- The urban poor spend 60-80% of income on food; the ripple effects of shocks can have severe economic and social consequences

Pressure on Natural Resources

- Rising demand for crops, livestock and biofuels is driving deforestation and land degradation— today 69% of all agricultural land is degraded
- 2x as much water will be required for food production in 2050, but 28% of agriculture is in water-stressed regions

Hunger, Obesity & Poor Nutrition

- 795M people in the world go hungry every day
- 2 billion people lack the nutrients to grow properly and live a healthy life
- 1.4B people are overweight or obese, driven by cheap calories and changing lifestyles

Farmer Employment

- Fewer people choose farming as an occupation, leading to an aging of the world's farmers
- 75M youth are unemployed globally, and 6 out of 10 youth workers in developing markets—where over half of people are employed in agriculture—lack stable work contracts

Climate Change

- The agrifood sector is responsible for 30% of global greenhouse gas emissions; rising demand for livestock and changes in land use will exacerbate this impact
- Climate change increasingly threatens food systems, as weather extremes cause up to 80% of variation in agricultural production



Emerging trends highlight promising steps toward more sustainable food systems

New Technology

New advancements in agricultural biotech, digital technology and data analytics are transforming agriculture through “precision farming” on an industrial scale in developed markets and new value chain links for smallholders such as digital finance, mobile weather and price information

Shifting Value Drivers

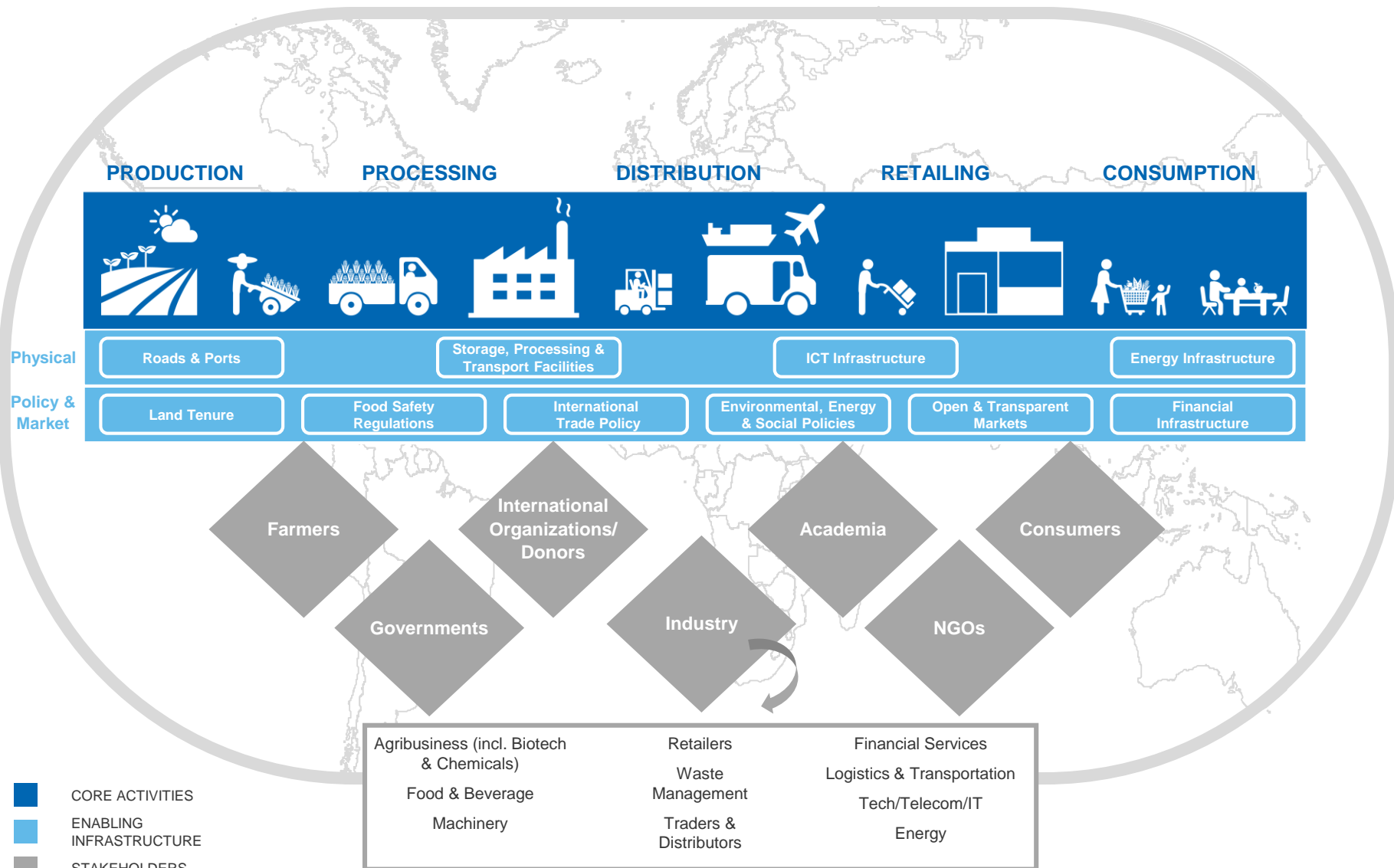
Companies increasingly emphasize “responsible investment”, which considers economic, social and environmental benefits, in their strategies and investment decisions. Consumer preferences in developed markets reinforce this trend – 51% of US consumers consider “emerging value drivers” such as food safety, health & wellness and corporate citizenship during food purchase decisions

New Business & Collaboration Models

New decentralized business models, such as local/mobile food processing and urban agriculture, are engaging new local actors in the food system. In parallel, new models of local, regional and global multi-stakeholder collaboration are emerging to connect actors across the system, especially as the world turns toward the new Sustainable Development Goals



The food system is complex and increasingly interconnected



Our aspirations for the world's food systems are not currently being met

The Aspiration



INCLUSIVE

Ensuring economic and social inclusion for all food system actors, especially smallholders, women and youth



SUSTAINABLE

Minimizing negative environmental impacts, conserving scarce natural resources and strengthening resiliency against future shocks



EFFICIENT

Ensuring that sufficient food is produced and available for the world's population



NUTRITIOUS & HEALTHY

Promoting consumption of a diverse range of healthy, nutritious, and safe foods

The Challenges

800

million people

in the agricultural sector
live **below the global poverty line**

70%

of water withdrawal

and **30% of greenhouse gas emissions** come from agrifood sector

60%

more food

will be required to feed a world
population of 9.5 billion by 2050

2

billion people

in the world suffer from
various forms of **malnutrition**

These aspirations are aligned with the UN Sustainable Development Goals, and achieving them will require coordinated action by all global food system actors to address systemic and interconnected challenges

Shaping the Future of Global Food Systems: A Scenarios Analysis

The World Economic Forum and Deloitte jointly developed scenarios for the future of global food systems and presented it to global leaders at Davos 2017

The World Economic Forum’s System Initiative on Food Security and Agriculture and Deloitte jointly conducted a scenario-building exercise on the future of global food systems. The objectives and focal question below highlight what we are aiming to achieve.

<p>Scenario analysis methodology</p>	<ul style="list-style-type: none"> Scenarios are a tool for broadening perspectives about alternative future environments in which today’s decisions might play out Typically, scenarios are presented as rich, dialogue-driven stories that allow leaders to think productively about contingencies, alternatives and robust strategies
<p>Objectives of this food systems scenarios analysis</p>	<ul style="list-style-type: none"> Provoke and challenge leaders to think in new ways about global food systems Provide new and actionable insights on potential disruptions and trends Motivate action to strengthen food systems Identify and enable new partnerships and alliances
<p>Scope and focal question considerations</p>	<ul style="list-style-type: none"> The question is framed globally to provide a “big picture” outlook for global leaders, with regional dimensions taken into consideration within the scenarios Nutrition and sustainability are highlighted because they represent key challenges facing global food systems The timeframe of 2030 was chosen to align to the UN’s Sustainability Development Goals (SDGs), generate urgency among current leaders, and identify strategic actions required in the near future to set a strong foundation for the following decades

Focal question

How will food systems nutritiously and sustainably feed 8.5 billion people in 2030?

To answer “How will food systems nutritiously and sustainably feed 8.5 billion people in 2030?” experts chose demand & markets as the critical uncertainties

At a workshop in September 2016, global food systems experts identified the two most critical uncertainties that will shape food systems by 2030.

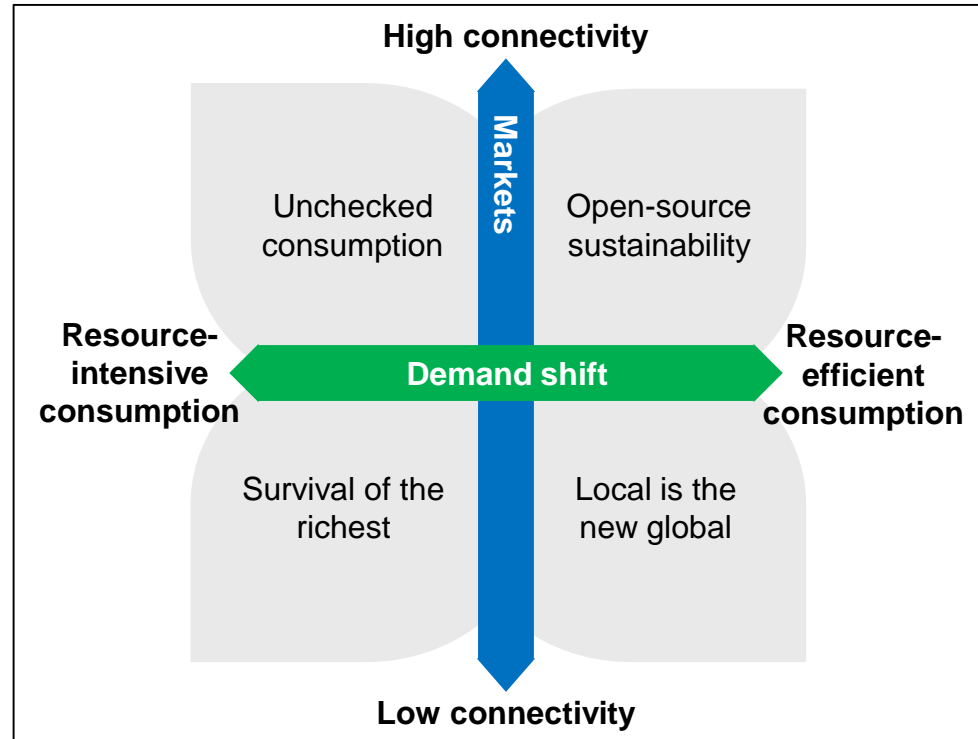
Rationale for demand shift as a critical uncertainty

- **Experts agreed that future changes in demand shift are a fundamental uncertainty** that will shape the entire food system by 2030.
- Uncertainties related to the nature of demand shift were particularly focused on the **environmental impact and health implications of consumer choices**. It is important to note that such choices are shaped by several accessibility factors and that healthy diets and environmental sustainability are not necessarily correlated but considered in tandem given their critical importance.

Rationale for markets as a critical uncertainty

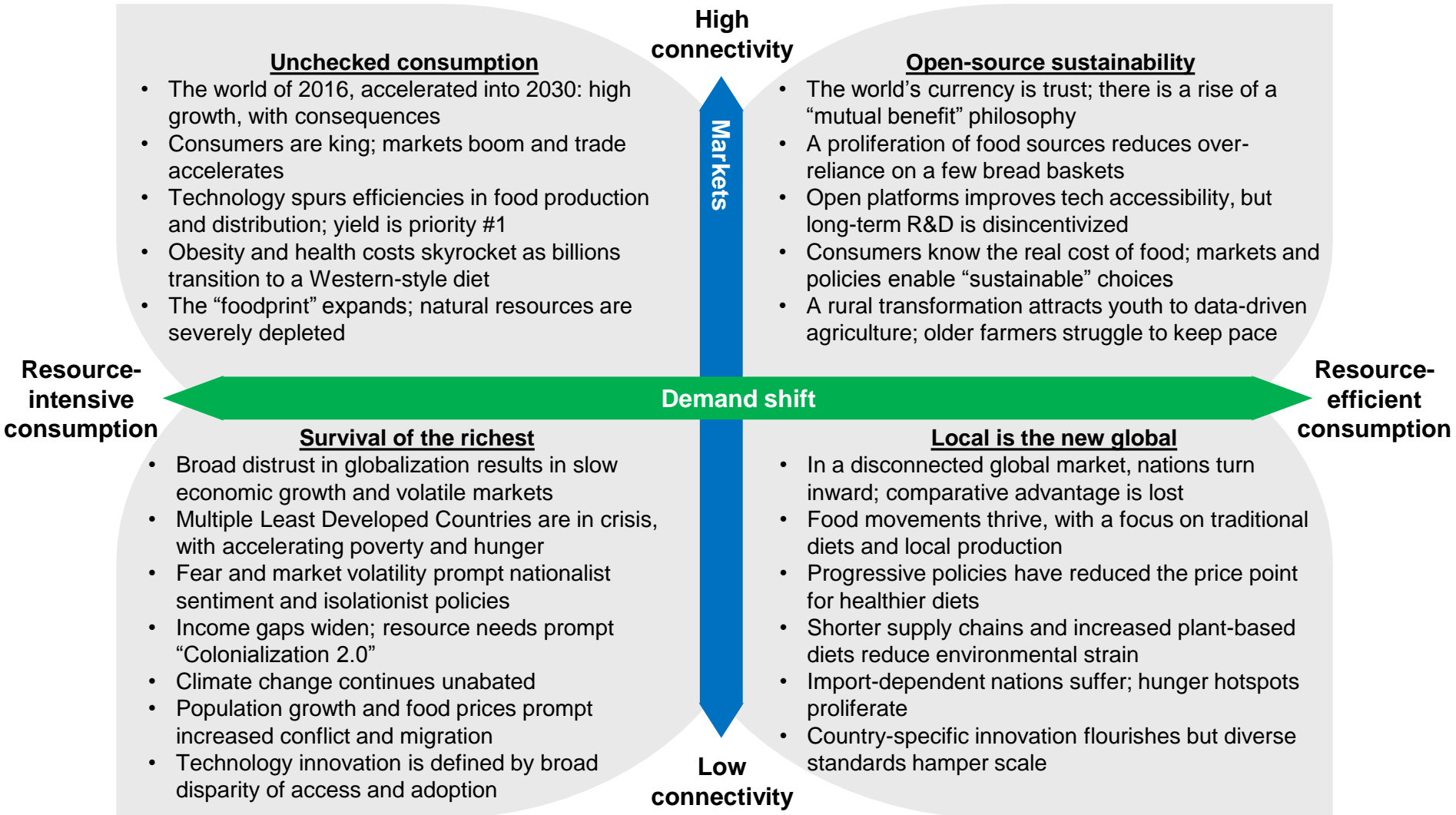
- Experts identified critical uncertainties and **significant risks and vulnerabilities related to the connectivity of markets**.
- This axis captures questions **pertaining to the relative openness of trade, trust in and resilience of commodity markets, and inclusivity of technological innovations**.

Final scenario matrix



This matrix serves as a basis to develop four scenarios for the future of food systems, which will incorporate other key uncertainties regarding climate change and natural resources, technology innovation and geopolitical security. Each will integrate relevant data points, regional variation and implications for a range of stakeholders. Together these will paint a set of provocative potential futures to inspire action.

While each scenario is complex and nuanced, the essence of each potential future can be captured in a few key ideas



The scenarios elevate key overarching messages that require urgent attention from executives, policy-makers, social sector leaders and consumers

Any of these scenarios is possible. Early signs of all four futures are present in our world today, and any of them could become a reality by 2030. Together, they demonstrate that today's food systems require a fundamental transformation to meet human needs within planetary boundaries.

-  **Consumption – as shaped by context – will make or break global health and sustainability.** The scenarios emphasize the importance of incentivizing, enabling and encouraging consumers to eat more resource-efficient diets in their respective contexts.
-  **Putting nutritious and sustainable food on every plate requires a fundamental redesign of food production systems.** Such a transition would put greater focus on the quality, rather than solely quantity, of agricultural production.
-  **Climate change will affect all future scenarios and poses a significant threat.** Climate change and natural resource degradation may compromise the long-term productive capacity of food systems, compromising social stability and economic well-being.
-  **Food system dynamics are likely to exacerbate inequality within and between nations.** Growing inequality will affect all possible futures. Each scenario has winners and losers; the disparity between them is most evident in a disconnected world of more resource-intensive demand.
-  **Fourth Industrial Revolution technologies and other innovations can revolutionize food systems but will introduce new challenges.** Technology innovations will dramatically reshape how we produce, manage and demand food in select markets, but their effects will be unevenly distributed.
-  **Our choices – through action or inaction – will determine our path.**

Action recommendations recognize the need to galvanize a global transformation in food systems towards the achievement of the SDGs

The analysis recognizes opportunities for leaders to pursue food systems transformation.

Business: A new era of business

- Capture market opportunities for investing in health and nutrition
- Contribute to greater resiliency in global markets
- Increase the resource efficiency of business operations
- Leverage technology to address social and environmental challenges in food systems

Government: New and bold “smart policies”

- Adopt a “whole of government” approach to integrate the true costs of food systems
- Link food, agriculture and environmental policies to healthy diets
- Create an enabling environment for inclusive technologies

Civil society: Social and ecological priorities

- Address structural inequality and meet basic needs
- Influence new dietary norms and aspirations
- Elevate the needs of future generations

All sectors: Responsive and responsible leadership

- Secure inclusive, sustainable, efficient, nutritious and resilient food systems
- Build greater levels of transparency, trust and collaboration within food systems

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Appendix

To inform uncertainties about the future, the following select “givens” have been identified as forces of change that are relatively certain in the 2030 timeframe.

	Trend	Description
Social	Population growth	The world population is expected to reach 8.5 billion by 2030, up from 7.3 billion in 2015 (UN).
	Rate of urbanization	Approximately 50% of the world’s population currently lives in cities and it is expected that by 2030 almost 60% will live in urban areas (UN).
	Growing middle class	The size of the global middle class is projected to increase from 1.8 billion to 4.9 billion by 2030 (WRI , OECD)
	Increasing Malnutrition	While the number of undernourished people has been decreasing and is currently estimated at 795 million people (WFP), the rates of overweight and obese adults are increasing in every region. If current trends continue, the number of overweight and obese people will have increased from 1.33 billion in 2005 to 3.28 billion, around one third of the projected global population (Global Panel).
Tech	Data growth	90% of the world’s data has been created in the last two years (World Economic Forum in collaboration with SAP) and is expected to continue to grow exponentially.
	Emerging technologies	Food systems will be influenced by emerging technologies – such as biotechnology, gene editing, robotics, big data, artificial intelligence and machine learning, prompting new market behavior and social considerations.
	Increase in connectivity	The number of internet users quadrupled from 2005 to 2015, with over 40% of the world’s population now estimated to be using the internet (ITU). It is predicted that the next billion people who are coming online will do so from cheap mobile phones.
Economic	Volume of smallholder production	There are some 500 million smallholder farms worldwide that are estimated to be producing over 80% of the food consumption in a large part of the developing world (UNEP).
	Poverty in the agricultural sector	800 million people in the agricultural sector live below the global poverty line, representing 78% of the world’s approximately 1.03 billion poor people (World Bank).
	Disparity of wealth	While the average world GDP, per capita, is expected to grow from \$10,000 in 2016 to around \$14,000 by 2030, the gap between the richest and poorest is estimated to stay almost the same (ERS International Macroeconomic Data Set). Currently the richest 1% have more wealth than the rest of the world combined (Oxfam).
Environmental	Climate change	Based on the plans submitted by 170 nations to curb their greenhouse gas emissions by 2030, temperatures are expected to rise between 2.7 and 3.7 degrees Celsius by 2100 - indicating current plans will fail to stay below the 2 degree global target (World Economic Forum collated by Reuters).
	Rate of emissions and natural resource depletion	The food sector accounts for 70% of water withdrawal (FAO) and 30% of greenhouse gas emissions come from the agrifood sector. Water withdrawals have increased threefold over the last 50 years and demand is anticipated to rise by a further 40% by 2030 (World Economic Forum from Water Resources Groups).
	Land degradation	69% of all agricultural land is degraded – a figure that continues to grow.
	Energy consumption	Global energy demand is projected to rise by 45% between 2006 and 2030 (UK Foresight).
Political	Increased rates of migration	The world is currently experiencing highest levels of displacement on record, with 65.3 million forcibly displaced people worldwide (UNHCR).

Critical uncertainty #1: Demand shift

The two critical uncertainties encompass several key associated elements.



Key elements of demand shift as an uncertainty

- Will people choose to consume **healthier, more balanced diets** or more **excessive diets high in animal-based protein and sugar, salt and fat**?
- Will consumers demand food that is produced in an **environmentally sustainable way**?
- Will **food production be able to respond** to changing consumer demand (including less food waste and energy consumption)?

Additional considerations

- How will consumer opinion evolve regarding food produced through new technologies?
- How will urbanization and the growth of megacities affect demand, especially among net-importing countries?

Critical uncertainty #2: Markets

The two critical uncertainties encompass several key associated elements.





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