SCENARIO 3

Centralised food chains, regulation and reliant on intensive farming

Consultants McKinsey last year predicted "continued consolidation of firms across the agribusiness value chain as well as the emergence of smaller niche players... In addition, millions of smallholder farmers are gradually integrating into commercial value chains".

McKinsey underlines investment by major agricultural traders such as Archer Daniels Midland, Bunge, Cargill and Louis Dreyfus in alleviating infrastructure bottlenecks in exports from countries such as Brazil. "Large-scale commercial farming has taken off in Brazil, where commercial farms can top 100,000 acres," the consultant adds.

"There is emerging interest in Africa as a production basin: major agribusiness companies are increasingly integrating vertically as more traders extend into production and processing, while retailers are moving into production and sourcing of key input commodities." It also believes strategic partnerships and acquisitions will be needed to make the most of the big data generated by disparate players in the food value chain.

Perrott says the same is happening in the logistics market. "While competition has increased at a regional level, we predict challenges will remain at a national level – dominated by a handful of big players."

Forum for the Future believes populations would be well fed in this centralised scenario, but reliant on intensive farming to the detriment of soil quality, forests and biodiversity. Indeed, McKinsey forecasts a future where livestock production in Brazil and Argentina rises to meet growing global demand.

Perrott says this trend is already emerging: "As we work more closely with our suppliers and clients on the longevity of their supply chains we predict more pressure in regulatory compliance around the integrity and sustainability of their supply chains, which is why many are pro-actively focused on making improvements now."

The EU recently imposed an imaginary meat tax – in the year 2024. It did so during a role play event (dubbed the 'hunger games' by some participants) in the US in November, joining with representatives from other governments, aid agencies and corporate food producers. The simulation hinted at the Forum for the Future's fourth scenario, "the fragmented world", where food security is beset by climatic and political instability, resulting in an every-country-for-itself world of intensive agriculture, with only resource-rich nations thriving.

• Taxing red meat

Sweden's minister for strategy and future issues formed a working group last year to consider a tax on meat, while the Danish government is reviewing a possible red meat tax following a recommendation from the Danish Council of Ethics in April.

SCENARIO 4

Chaos. The UN projects a world population of nine billion by 2050 – and the quest for food fuels conflict

The UN's Food and Agriculture Organisation predicts that meat consumption will have doubled by 2050 as emerging countries switch to more opulent diets, and that 90% of growth in global crop production will have to be achieved through intensification of practices, yields and land use.

"While substantial additional land could, in principle, be suitable for food production, in practice, land will come under growing pressure for other uses," says Read. "For example, land will be lost to urbanisation, desertification and rising sea levels. Despite intensified production, arable land will have to expand by around 120 million hectares in developing countries, mainly in sub-Saharan Africa and Latin America."

Recouping the 30% of food Forum for the Future says is wasted globally would help. Perrott says their clients are focused on this. "Our key focus areas include portion, case-size and shelf-life optimisation as well as the introduction of food recycling mechanics."

At the Institute of Food Science and Technology, Bassett believes the case for a sci-fi food revolution may be overstated. "While technologies that help break us out of the current production and space limitations will feature, it is those that will also deliver better outcomes for soils, animals, people and the climate that will have the most impact. Harper's aeroponics system at MIT generates open source data – climate recipes, if you will – which he hopes to share with small producers.

"Sometimes it will be about synthesising and sharing knowledge." says Bassett. "Whether we tax it, culture it, bioengineer it, shut it in a box, or order online via cow computing, our future food will be best served if everyone in the supply chain keeps talking to each other."

• Natural disaster contingency plans

A fictional scenario acted out in the US last year began in 2020 with El Nino devastating crops in India and Australia, followed by a major drought in North America the following year. As availability of food declined, countries increased regulation and then enacted emergency measures and then worked with the United Nations to handle refugees from climate catastrophes.