

Managing Trade-offs in Food Systems: How holistic risk assessment can support better policy decisions

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Main takeaways

- Food policy decisions increasingly involve trade-offs between food safety, nutrition, environmental sustainability and economic feasibility.
 - Assessing risks in isolation may lead to unintended consequences elsewhere in the food system.
 - Holistic risk assessment provides a structured framework for evaluating these trade-offs and supporting more balanced policy decisions.
 - Different policy questions require different combinations of assessment methods and levels of analytical integration.
 - A tiered approach allows evidence to be adapted to the policy context, available data and resources.
 - Early collaboration between policymakers, risk assessors and experts from multiple disciplines is essential for transparent and effective decision-making.
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Introduction

European food systems are expected to deliver safe, nutritious, affordable and sustainable food while responding to major societal challenges, including climate change, resource constraints and changing consumer expectations. Achieving these objectives often requires balancing competing priorities. Actions intended to improve one outcome may inadvertently create negative consequences elsewhere in the food system.

Traditional assessments typically evaluate food safety, nutrition, environmental sustainability or economic impacts separately. While these approaches remain scientifically robust within their respective domains, they are less suited to supporting policy decisions that must simultaneously consider multiple objectives.

Holistic risk assessment offers a systems-based approach that integrates evidence across these dimensions, helping policymakers better understand trade-offs and make more informed decisions.

Issue description

Food policy decisions increasingly involve balancing competing objectives rather than maximising a single outcome. Interventions designed to improve food safety, food security, nutrition, sustainability or affordability rarely affect only one aspect of the food system.

Food systems comprise interconnected activities from primary production through processing, distribution and consumption. Decisions taken at any stage can influence multiple outcomes across the system.

For example, more intensive thermal processing may reduce microbiological risks but increase energy consumption and generate process-induced contaminants. These trade-offs are becoming a defining feature of modern food systems.

Despite this complexity, scientific assessments are still largely organised within domain-segregated approaches. Food safety, nutrition, environmental and economic assessments each provide valuable evidence, but considering them separately can make it difficult to understand the overall consequences of policy options across the food system.

Importantly, the challenge is not the absence of assessment methods. Robust methodologies already exist to evaluate individual dimensions of food systems. The challenge lies in selecting the most appropriate methods for the policy question and combining them in a transparent way. Holistic risk assessment provides a structured way of bringing these complementary assessments together, rather than replacing them.



Key messages for policy makers

Recommendation #1:

Adopt a systems perspective when framing food policy questions

Food policy should move beyond assessing individual risks or single domains in isolation. Policy questions should instead consider how interventions affect multiple objectives across the food system, including public health, food security, environmental sustainability and economic performance.

Holistic risk assessment supports this systems perspective by making trade-offs explicit and allowing decision-makers to evaluate the broader consequences of different policy options. Rather than seeking to optimise a single objective, it helps identify balanced solutions that reflect the interconnected nature of food systems.

Recommendation #2:

Select assessment methods according to the policy question

Holistic risk assessment is not a single methodology but a decision support framework that combines complementary assessment methods according to the policy question.

Risk-benefit assessment of foods integrates food safety and nutrition, allowing comparison across different health outcomes using a common public-health metric such as the disability-adjusted life year (DALYs). Life Cycle Assessment evaluates environmental impacts across the product life cycle, while economic assessments may include cost-of-illness studies, cost-effectiveness, cost-utility or cost-benefit analyses, depending on the policy question being addressed. Multi-criteria decision analysis and cost-benefit analysis support transparent integration of these dimensions.

No single method is universally best—the choice depends on the policy question, available data, timeframe, resources and intended users. The evidence supports a tiered approach in which descriptive methods are progressively complemented by quantitative and integrated analyses (e.g. risk-benefits and cost-benefits) as the complexity of the policy question increases.

Recommendation #3:

Develop practical guidance for implementing holistic assessments

Successful holistic assessments begin with a clearly formulated policy question developed jointly by policymakers and scientific experts using a transdisciplinary systems perspective. The assessment should adopt a systems perspective, identify relevant dimensions and indicators, and communicate assumptions and uncertainty transparently at every stage of the assessment.

The tiered approach allows the level of integration to be adapted to different temporal and geographical scales, policy contexts and resource availability.

Conclusion

As European food systems become increasingly interconnected, policymaking must move beyond single-risk assessments towards approaches that better reflect the complexity of real-world decisions.

Holistic risk assessment does not replace existing scientific methods. Instead, it combines evidence from food safety, nutrition, environmental and economic assessments to support transparent evaluation of trade-offs in complex policy-decisions.

By selecting assessment methods according to the policy decision question and progressively integrating evidence where appropriate, policymakers can make decisions that are more coherent, transparent and applicable across different temporal and geographical contexts.

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