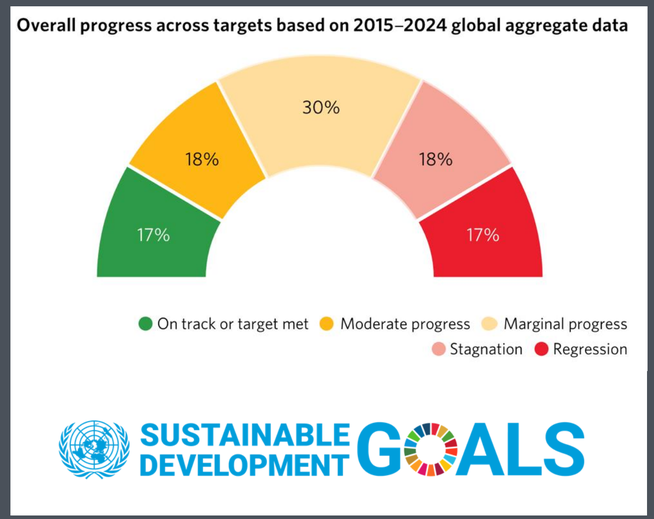
Future-Ready Food Safety: Managing Risk, Building Resilience, and Ensuring Sustainability in Emerging Food Systems

TIMES OF CRISIS, TIMES OF CHANGE STRATEGIES FOR ACCELERATING TRANSFORMATIONS TO SUSTAINABLE DEVELOPMENT

Dr Moez SANAA

World Health Organization

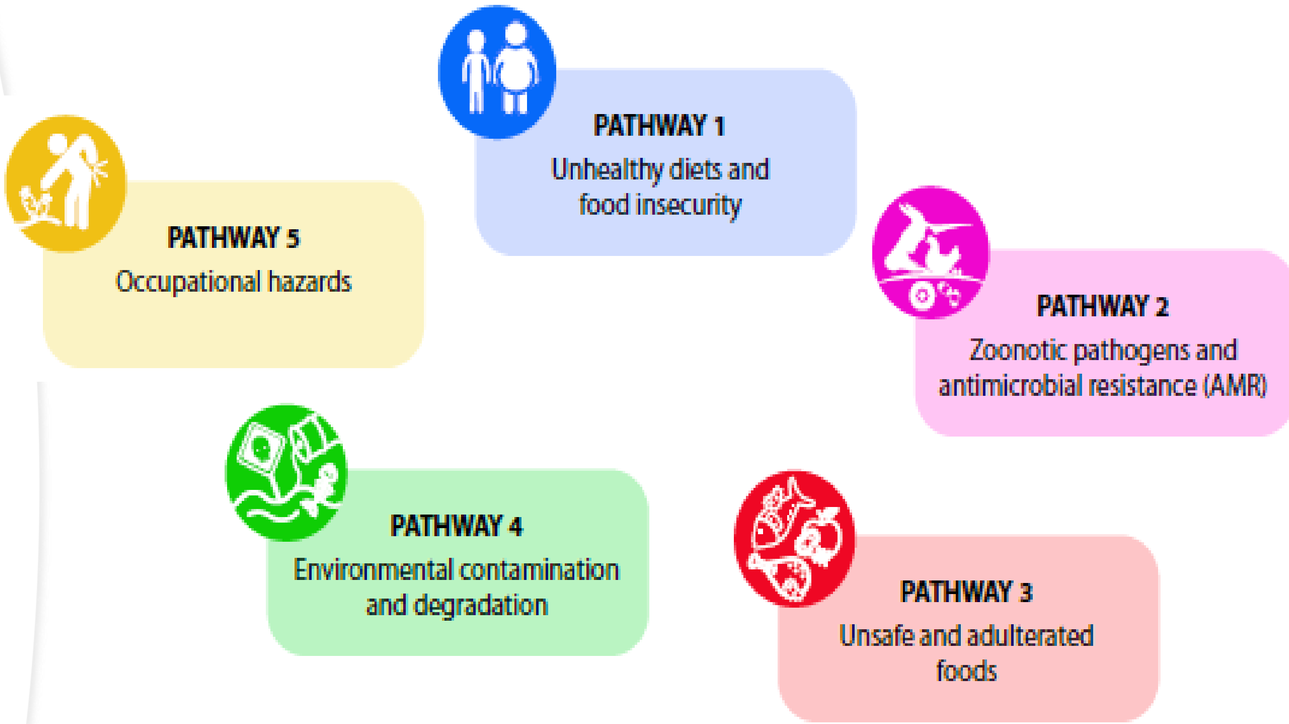


Poor Nutrition and Food Safety

2nd most significant risk factor to mortality in the world

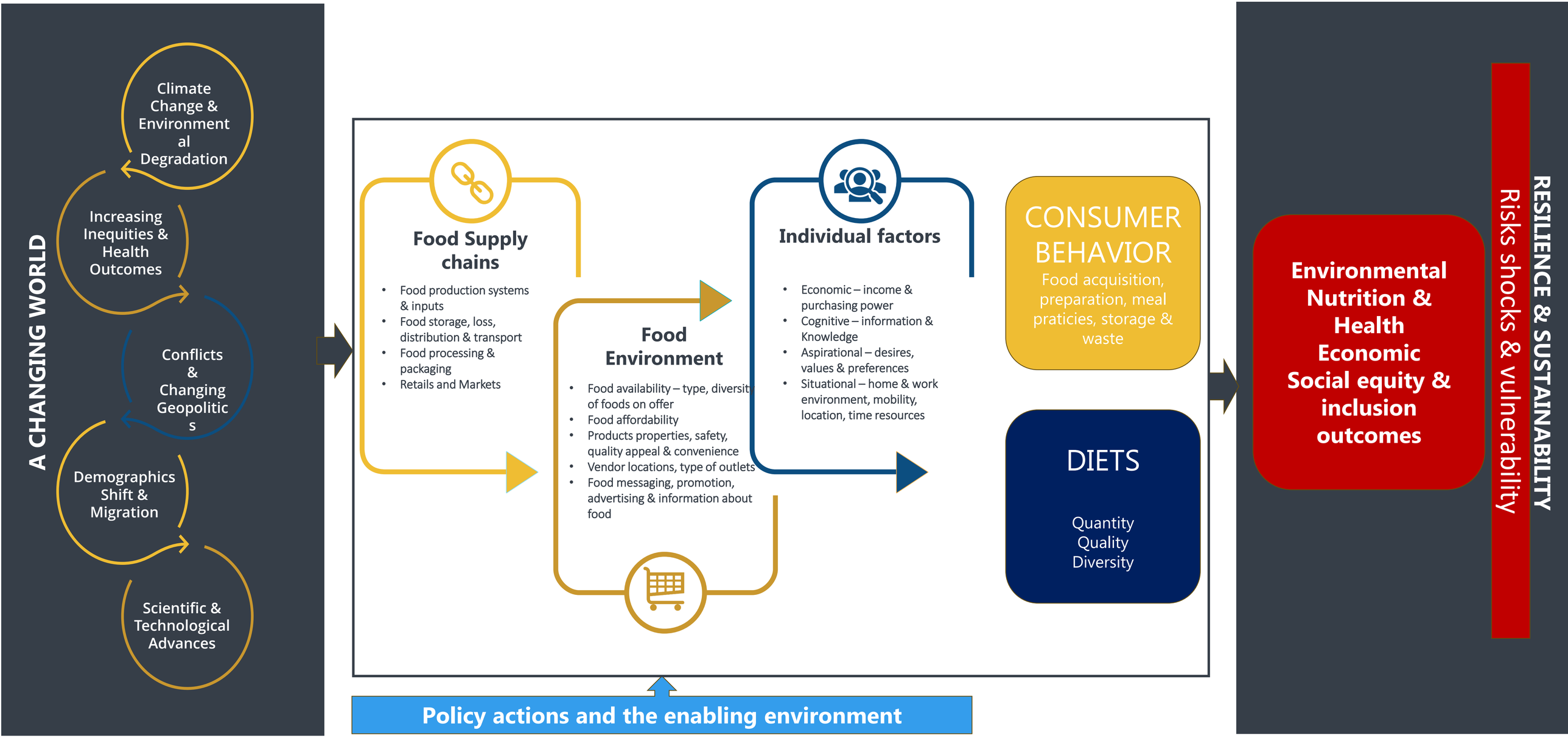
- 3 billion people (half of the world) not able to access to affordable healthy diet
- 735 million (10%) undernourished
- 148 million of children < 5 years of age stunted and 45 million are wasted
- 37 million of children < 5 years of age overweighted
- 2.2 million of adults overweighted and obese
- Every year foodborne diseases cause:
  - 1 in 10 people to fall ill
  - 420 000 deaths
  - Children account for 1/3 deaths from foodborne diseases

Food systems affect health through multiple pathways



FOOD SYSTEMS

Integrating food safety and nutrition in food systems policy and programming is essential to maximize synergies and avoid unintended negative impacts.



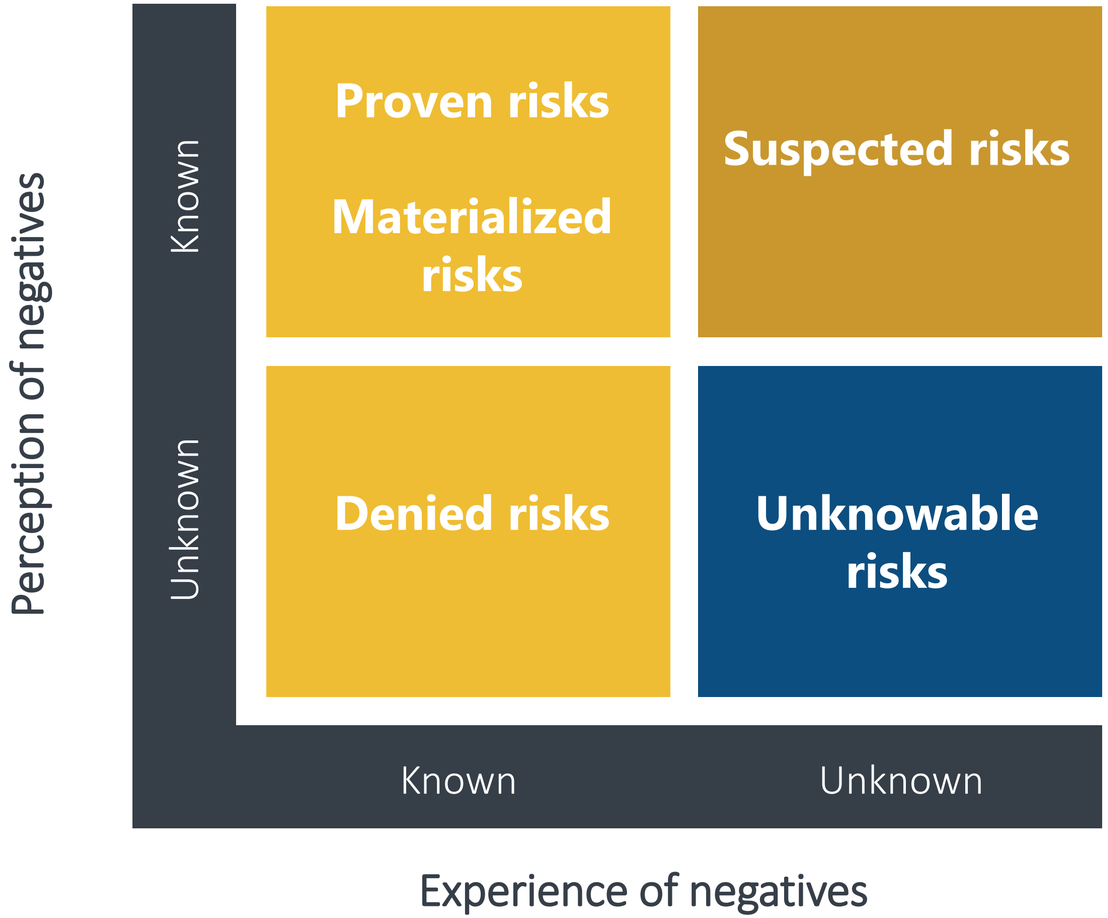
RISK GOVERNANCE

Actors, Rules, Conventions, Processes, and Mechanisms concerned with how relevant risk information is collected, analyzed, and communicated and how management decision are made

Type of risk	Definition	Main features	Examples	Implications
Conventional risks	Known and well-defined risks	• Familiarity – recognisable patterns and management regimes that are relatively stable and have proven to be effective if implemented according to certain rules	• Bicycle theft • Salmonella infection • Car accidents • Obesity	Use standard risk management practices, e.g., regulation
Emerging risks*	New risks or known risks that become apparent in new context conditions (IRGC 2015)	• Uncertainty regarding causes, potential consequences, and probabilities of occurrence • Lack of familiarity with the risk	• New processes and products in the field of synthetic biology • Malaria spreading to higher latitudes	Focus on early detection and analysis of elements that trigger emerging risks. Prepare to revise decisions and adapt
Systemic risks	Threats that individual failures, accidents or disruptions present to a system through the process of contagion	• Highly interconnected risks with complex causal structures, non-linear cause-effect relationships • Lack of knowledge about interconnections in an interdependent and complex environment, prevention	• Desertification and collapse of the Aral Sea • 2008 global financial crisis • Pandemics • Cyber-security • Global climate change • Fish stocks depletion	Focus on adaptation and transformation of the organisation and the system

* Some emerging risks may manifest themselves in complex systems and thus require a systemic approach to their assessment and management. Some systemic risks may be first seen as emerging.

Risks: about data, negatives and perception



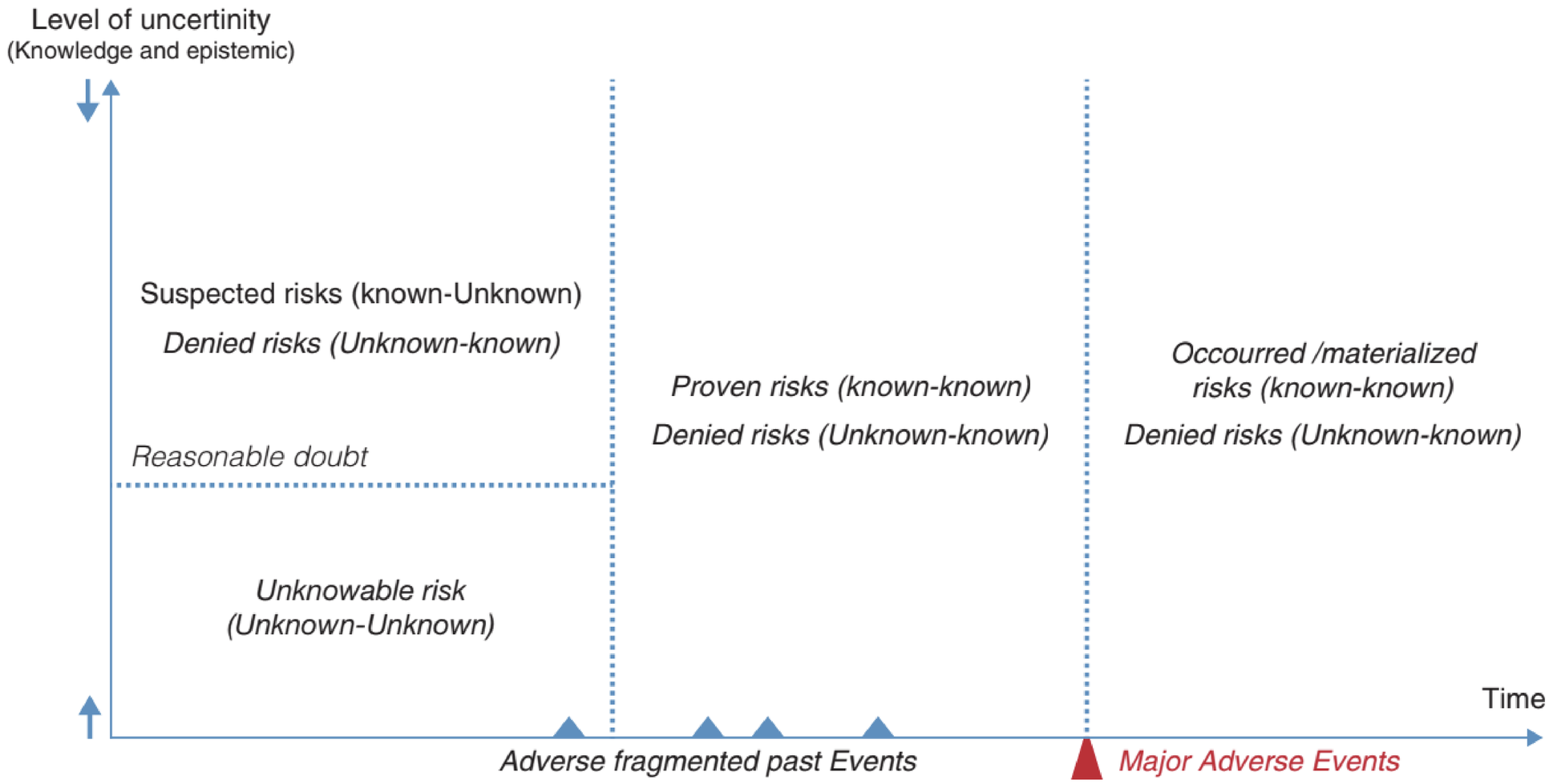
The known-knowns, or “Proven risks and Materialized risks”: based both on their experience and their perception of “negatives,” actors can give pieces of information, facts, and arguments that contribute to proving that negatives have and then can occur.

For known-unknowns, or “Suspected risks”: actors give arguments and pieces of evidence and doubts are mobilized, but facts are difficult to find and demonstrate; knowledge is not stabilized on the topic.

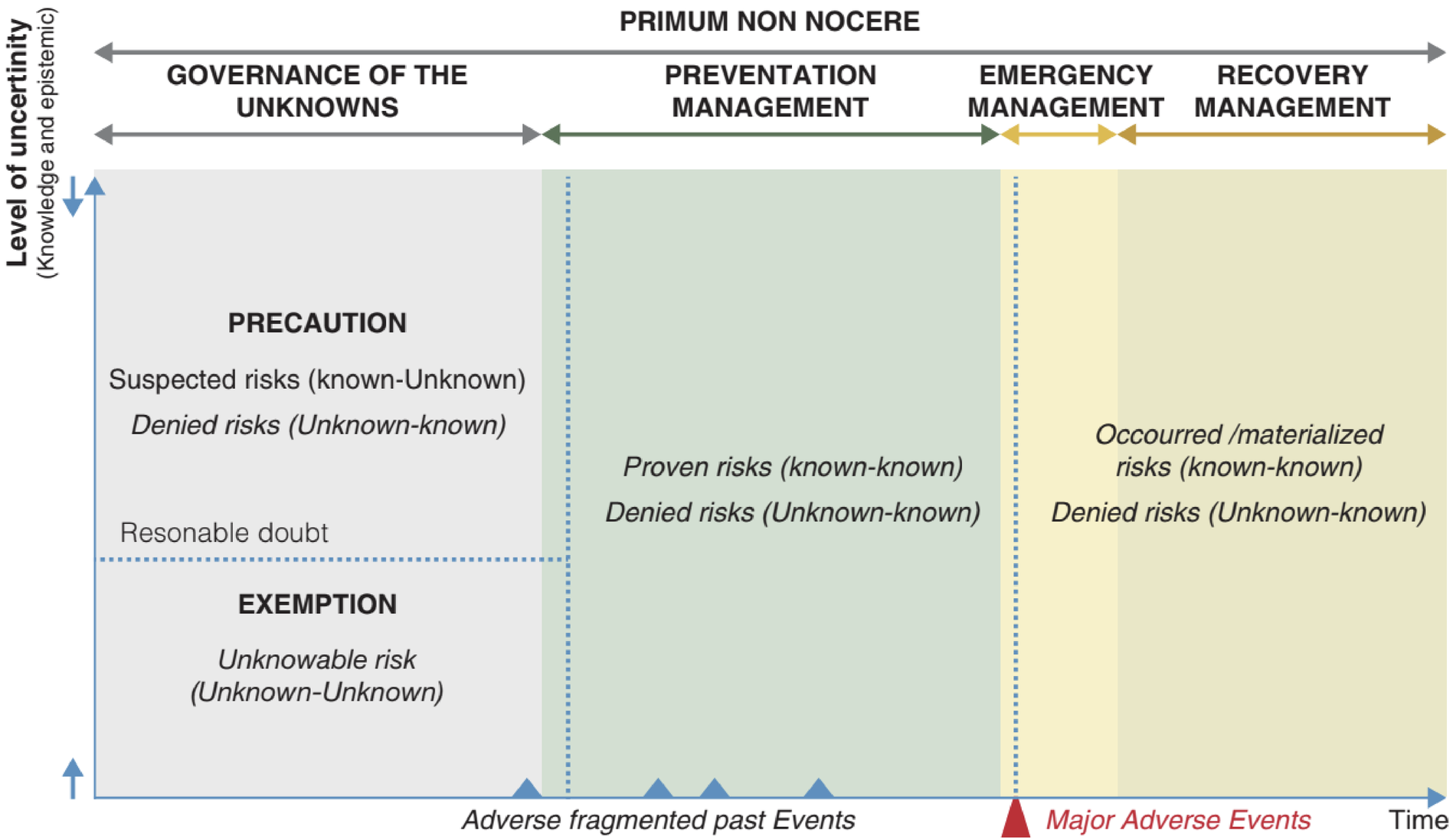
For unknown-knowns, or “Denied risks”: actors have experimente directly or indirectly the negatives and have the information of th occurrence of negatives
somewhere, but they do not wish to consciously or unconsciousl perceive it as a risk.

For unknown-unknowns, or “Unknowable risks”: the actors have neither the direct and indirect pieces of evidence about negatives nor the perception of the
risk due to a lack of information, a lack of knowledge sharing and stabilization.

How time and knowledge on negatives influence the attribution of a risk to a category?



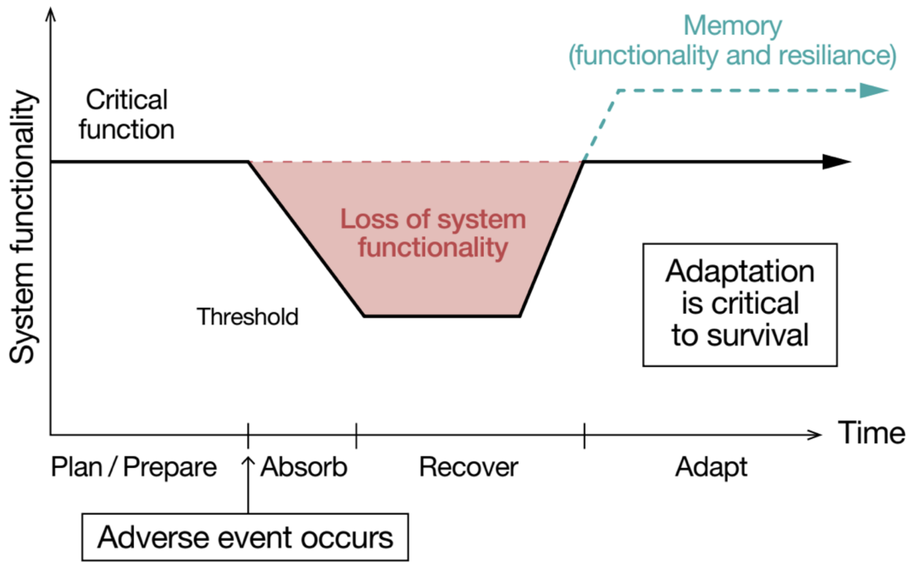
Risks and responsibility principles



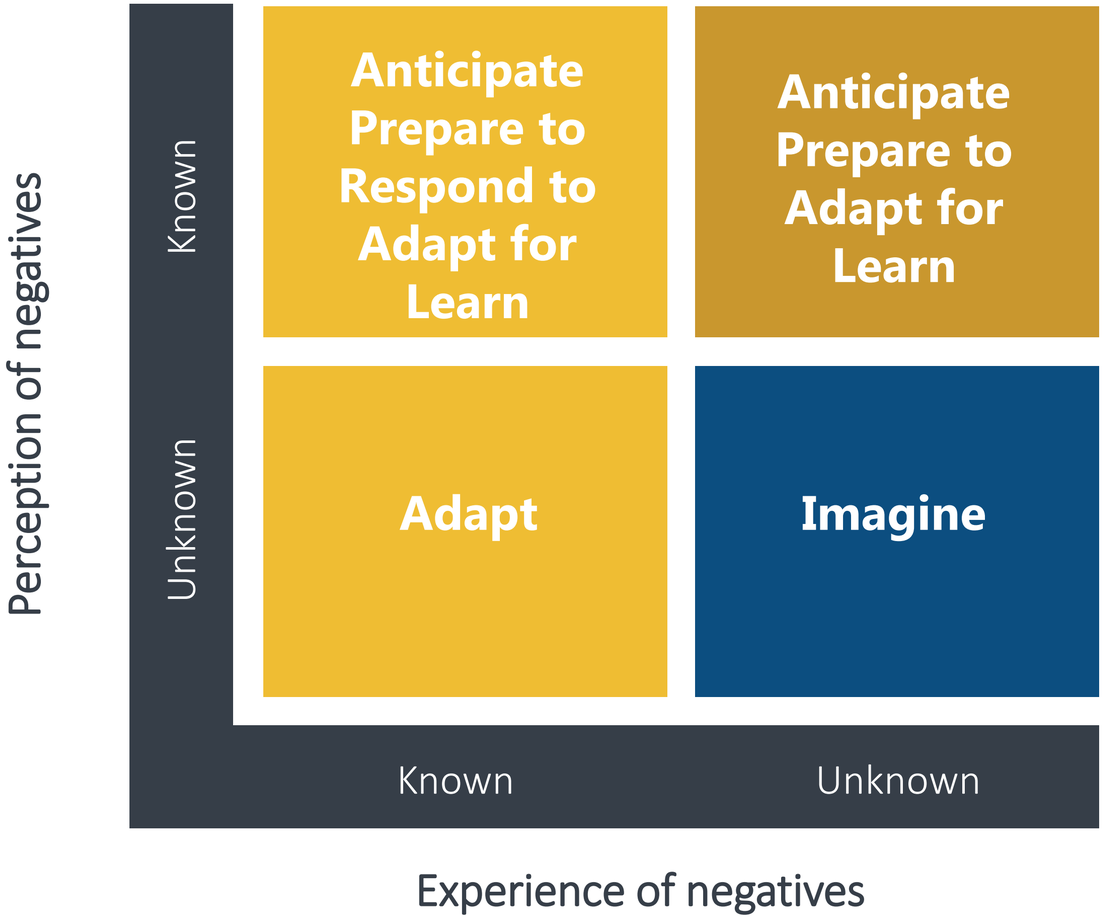
Resilience and the Unknown

- **Risk analysis and resilience**: Classic risk analysis is suitable for known-known risks, while resilience focuses on managing extreme or unknown risks.
- **Post-event resilience**: Defines resilience as a system's ability to respond, absorb, and adapt to unforeseen disruptions or negatives, often through continuity planning, emergency planning, and insurance mechanisms.
- **Risk-based resilience**: Emphasizes the system's ability to anticipate, prepare, respond, and adapt, aligning closely with risk management processes.
- **Responsibility in resilience**: Resilience approaches examine shared responsibilities, including preparing for, bearing, and enduring negatives, contrasting with risk-based models where responsibility is often clearer.
- **Distinction between systems**: Technical systems follow similar resilience and risk-based approaches, while sociotechnical systems highlight more distributed responsibility among actors.

- **Coping with the unexpected**: Both approaches require preparation for known risks and management of the unexpected, but resilience focuses on acceptance and adaptation.
- **End goals**: Risk-based systems aim to reduce negatives, while resi and end
- **Resi** :ess, and end lapting to the
- **Sub** tems doe .
- **Con** remain cen

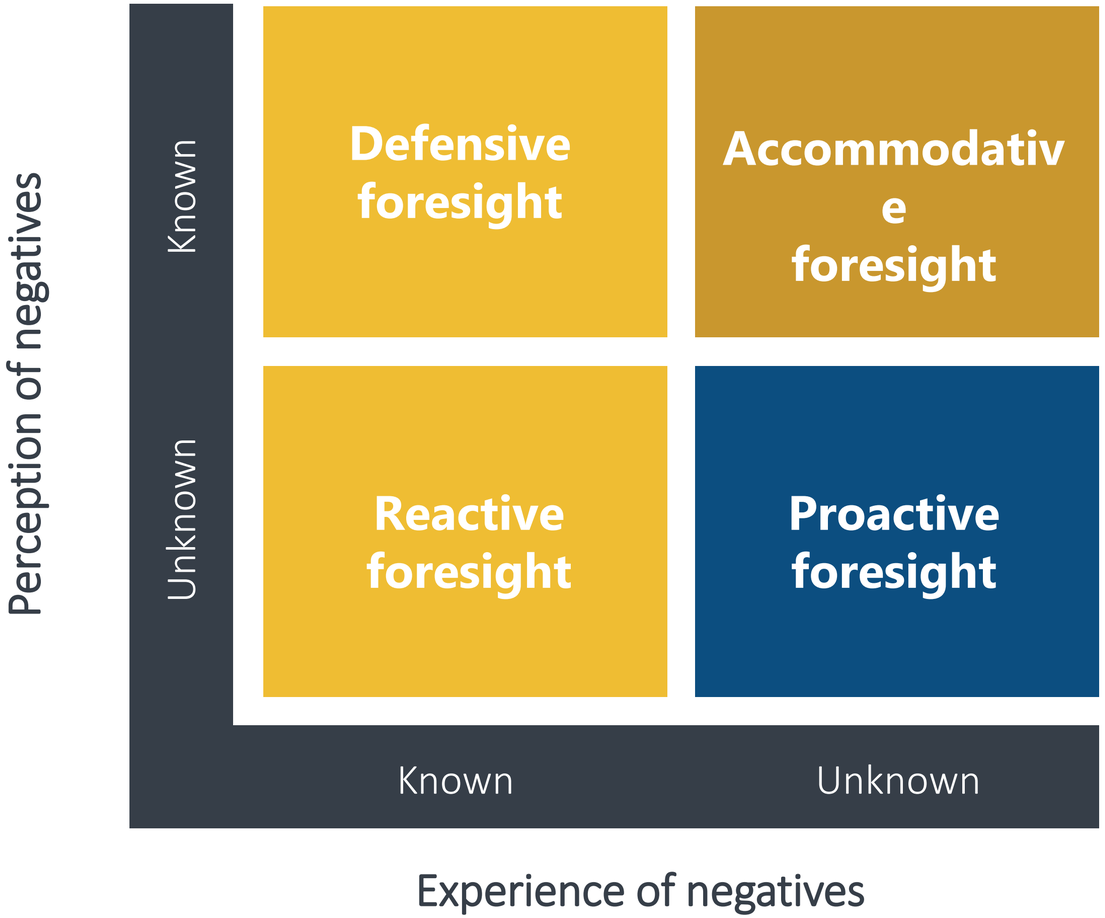


How does resilience deal with negatives?



Resilience as the ability of a system and its subsystems to anticipate, prepare for, respond, adapt to and learn from incremental changes and to sustain sudden disruptions.

Foresight and risk categories



For the “known-knowns,” the foresight mechanism is a “defensive” one that consists mainly of applying lessons learned in similar historical examples to futuristic problems.

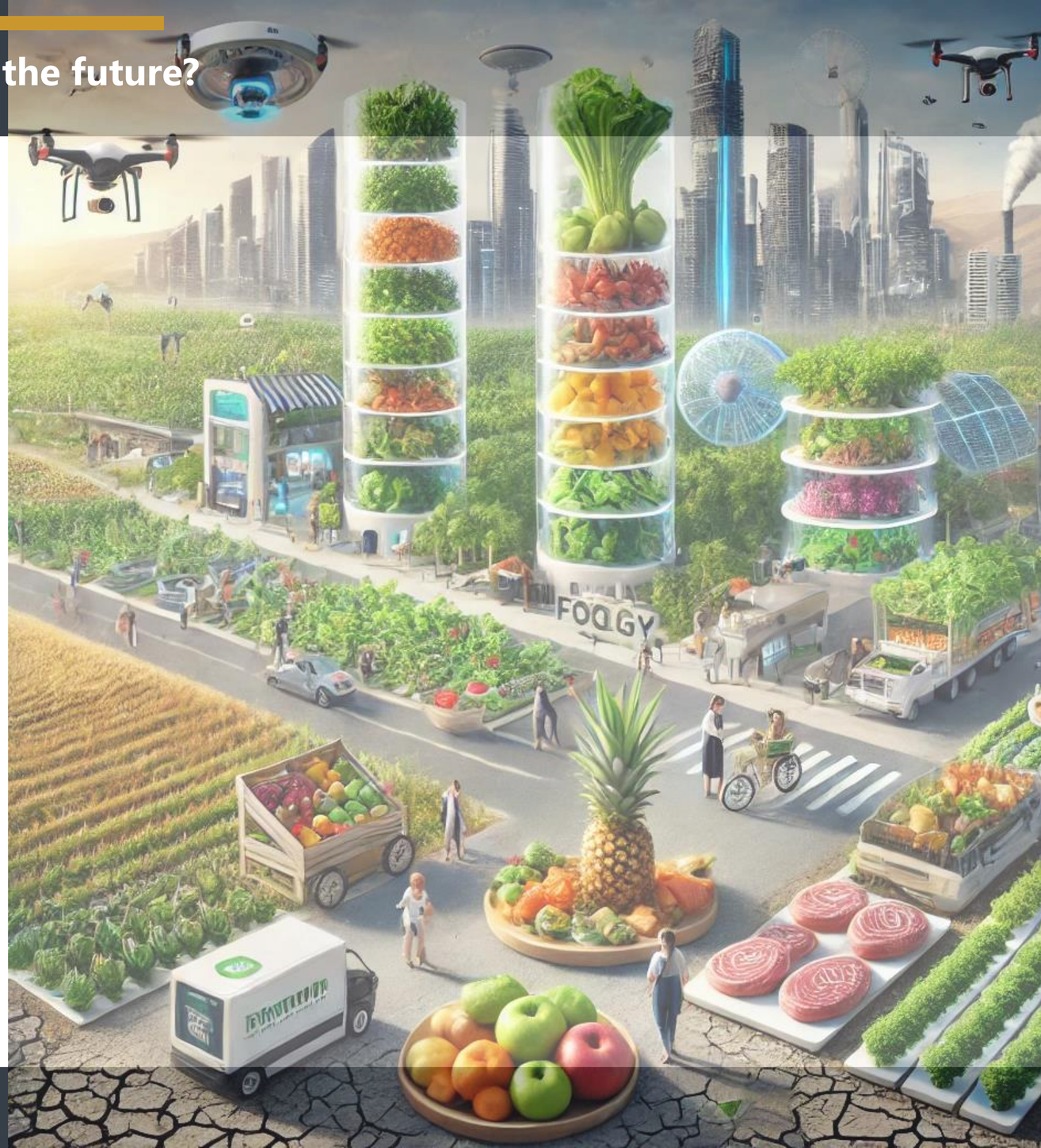
The “known-unknowns” are risks for which we dispose of few or contradictory pieces of knowledge and information. Depending on the cultural, systemic, and contextual factors, the foresight is accommodative and consists in imagining the “worst-case scenario,” using a “benefit-cost analysis” and a precautionary governing attitude until negative events occurred.

For unknown-knowns, denial of risk is cognitively a voluntary or an involuntary mechanism of blindness to negatives that proceed. Foresight is with that respect said to be “reactive” based on the fact that the analyst, the DM or actors see the future with rose-colored glasses until they face negatives.

For unknown-unknowns, Foresight is “proactive” in the sense that the analyst, the DM and the actors have to project a vision of what is suitable for the sociotechnical system with respect to the *Primum non nocere* principle.

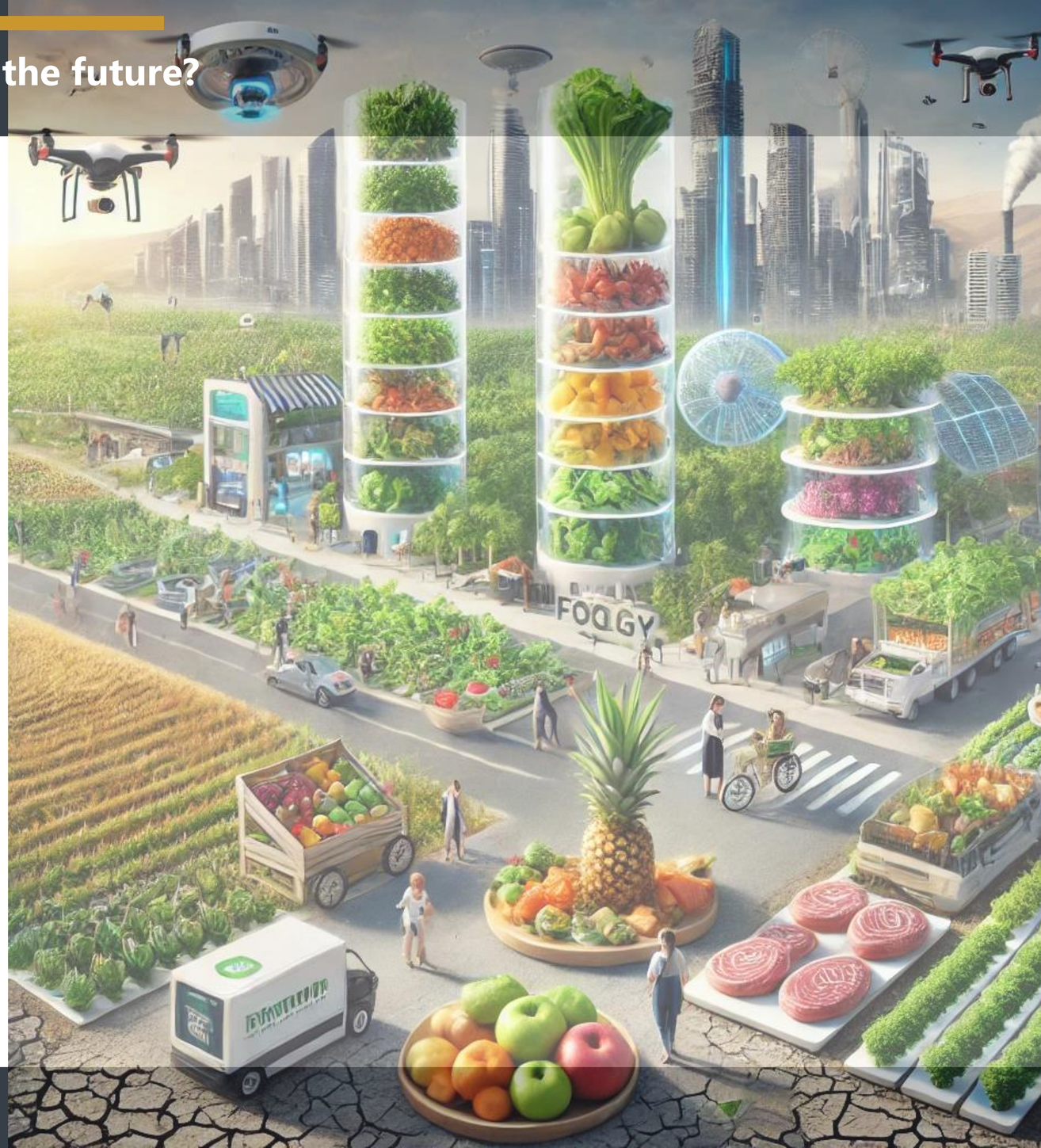
Ready for the future?

- **Deficiencies in risk and resilience approaches**: Both risk-based and resilience-based approaches struggle to handle the unexpected adequately.
- The application of **Risk based** approach will continue to solve the known-knowns and build and maintain the scientific capacities
- Needs to go beyond **forecasting approaches** that rely mainly on the past to predict the future, or that elicit and calibrate expert judgements in the event of data paucity
- **Foresight**: construction of informed representations of possible futures - including the identification of future risks and opportunities – dialogue among different stakeholders and combination of different types of knowledge to support decision making.
- Use the increasing power of **analytics** (e.g., AI, Agent based models) the simulate and represent scenarios and their consequences.
- Leverage current and future technologies to generate, curate, and share the relevant good **quality data**



Ready for the future?

- New approaches for novel food safety assessment (**NAMs**)
- Integrated approach to **risk and benefit** – the solution of known systemic risks may create new systematic risks
- Ensure that all countries, regardless of their economic level, have the fundamentals of a **functional food control system.**
- Ensure that **data-driven** approaches are effective everywhere.
- Increase **trust in science**.
- Encourage **participatory approaches** in research and implementation of solutions for the food system.



Strategic Priorities

RESILIENCE AND RESPONSE TO CLIMATE CHANGE

Develop and implement strategies to enhance the sustainability and resilience of food systems to climate change

SOUND SCIENTIFIC ADVICE AND EVIDENCE

Foster interdisciplinary research and leverage scientific advancements to address the complexities of food safety and nutrition.

ROBUST NATIONAL FOOD CONTROL SYSTEMS

Strengthen food control systems to ensure the safety and quality of food from farm to table

SUPPORTIVE FOOD ENVIRONMENT

Create and maintain a food environment that supports healthy and sustainable dietary choices and behaviors.

PREPARED TO EMERGING ISSUES AND CRISES

Anticipate and prepare for new and emerging issues & Enhance preparedness and response mechanisms for food safety and nutrition crises

CONCLUSION

Dr. MOEZ SANAA