Joint Research Centre

Supporting research, technological development and innovation

European Commission
DG Joint Research Centre

Foresight and Horizon Scanning

Foresight and Behavioural Insight Unit
Fabiana Scapolo, PhD
Deputy Head of Unit

JRC in the Commission

President
Jean-Claude JUNCKER

27 Commission Members (7 Vice Presidents and 20 Commissioners)

Commissioner for Education, Culture, Youth and Sport
Tibor Navracsics

Director-General
Vladimír Šucha
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DG Education and Culture

JRC's Mission and Role

… is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Direct research:
JRC is the European Commission's in-house science service and the only DG executing direct research to provide science advice to EU policy.

Serving society, stimulating innovation, supporting legislation

JRC at a glance

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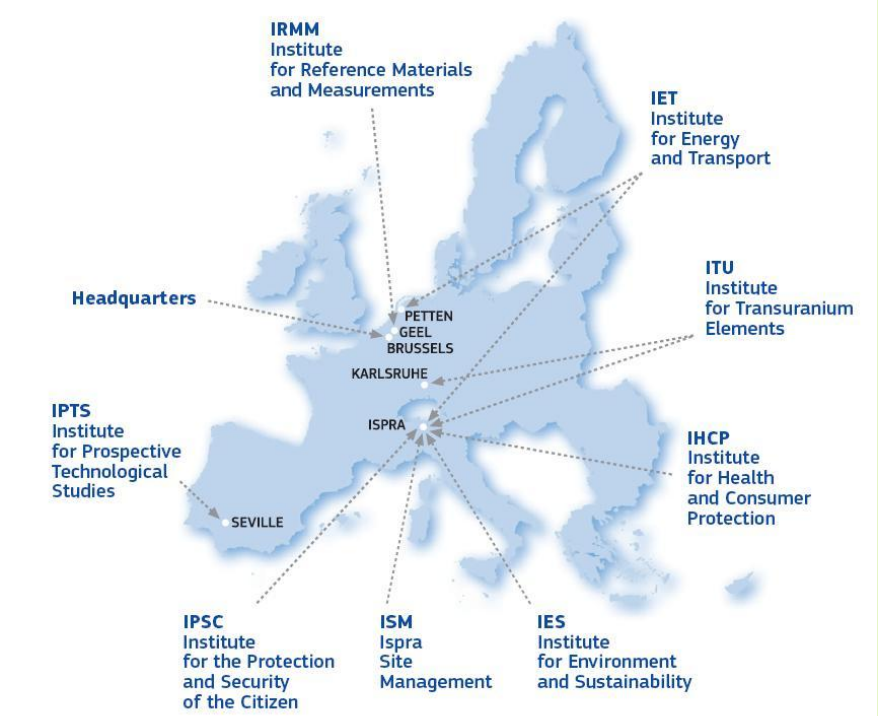
- Established 1957
- 7 institutes in 6 locations
- 3055 staff in December 2014
- 1370 scientific publications in 2014
- Budget: €374 million annually, plus €72.8 million earned income



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JRC Institutes

- IRMM – *Geel, Belgium*
  Institute for Reference Materials and Measurements
- ITU – *Karlsruhe, Germany, and Ispra, Italy*
  Institute for Transuranium Elements
- IET – *Petten, The Netherlands, and Ispra, Italy*
  Institute for Energy and Transport
- IPSC – *Ispra, Italy*
  Institute for the Protection and Security of the Citizen
- IES – *Ispra, Italy*
  Institute for Environment and Sustainability
- IHCP – *Ispra, Italy*
  Institute for Health and Consumer Protection
- IPTS – *Seville, Spain*
  Institute for Prospective Technological Studies

JRC addresses the full policy cycle

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The JRC contribution to the EU Policy Cycle

Policy anticipation

- Agenda-setting
- Horizon scanning
- Foresight

Policy formulation

- Preparation of science based policy options
- Modelling

Policy adoption

- Science advice
- Standards, incl. reference materials, measurements and methods

Policy implementation

- Compliance checks
- Independent verification
- Anti-fraud measures

Ad-hoc policy support

- Crisis response

Policy evaluation

- Effectiveness and impact assessment

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JRC priorities in Horizon 2020

- Single market: growth, jobs and innovation
- Low-carbon economy and resource efficiency (environment, climate change, energy, transport)
- Agriculture and global food security
- Public health, safety and security
- Economic and Monetary Union (EMU)
- Nuclear safety and security

Horizon scanning and Foresight

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Horizon scanning

A systematic method for gathering new insights on issues which may impact the future.

Horizon scanning explores novel and unexpected issues as well as persistent problems and trends, including matters at the margins of current thinking that challenge past assumptions. It is often based on desk research, helping to develop the big picture behind the issues to be examined. Desk research involves a wide variety of sources, such as the Internet, government ministries and agencies, non-governmental organisations, international organisations and companies, research communities, and on-line and off-line databases and journals.

What is foresight?

A definition

Foresight provides a space to different stakeholders and experts for **systemic thinking and developing anticipatory knowledge.** It explores future changes by anticipating and analysing possible future developments and challenges both qualitatively and quantitatively, and supports stakeholders to actively shape the future vision for today strategies and actions.

(from A Glossary of Terms commonly used in Futures Studies)

http://www.fao.org/docs/eims/upload/315951/Glossary%20of%20Terms.pdfFull Version

What is foresight?

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Why is thinking about the long-term powerful?

- helps to get out from present day concerns
- helps to go beyond the current mainstream thinking
- helps to look for opportunities
- better anticipate the challenges that shape the future
- supports creativity for today's strategies and actions
- helps break gridlock.

What is foresight?

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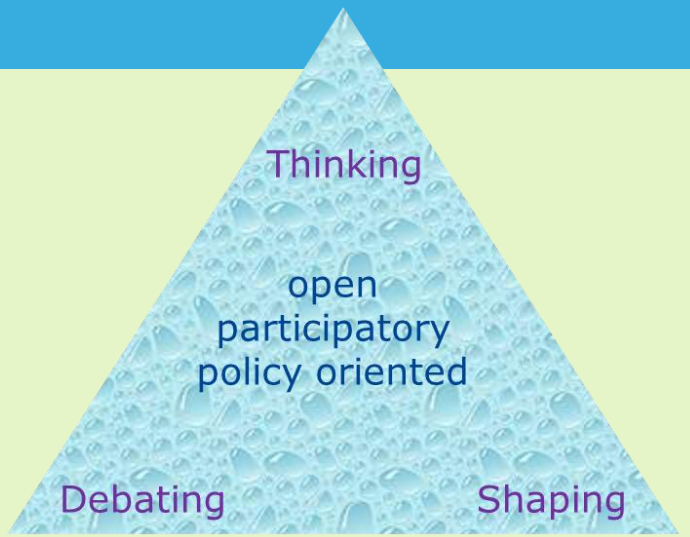

Foresight …

- does not predict the future
- complements desk research analyses with structured dialogue
- enhances future thinking by gathering anticipatory intelligence from a wide range of knowledge sources in a systematic way
- structures the analyses to ensure the emergence of collective intelligence derived beyond established pathways and links it to today's decision making

What is foresight?

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Foresight, Forecasting, Planning

Foresight can use forecasts, can contribute to planning, assumes that there are numerous possible futures that can be created through the actions we choose to take today

A **Forecast** often assumes that there is one probable future

Foresight time horizons should be beyond the usual **planning** horizons. Typical foresight time horizons vary between 5-30 years but may be longer

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The purpose of foresight

Purpose of foresight

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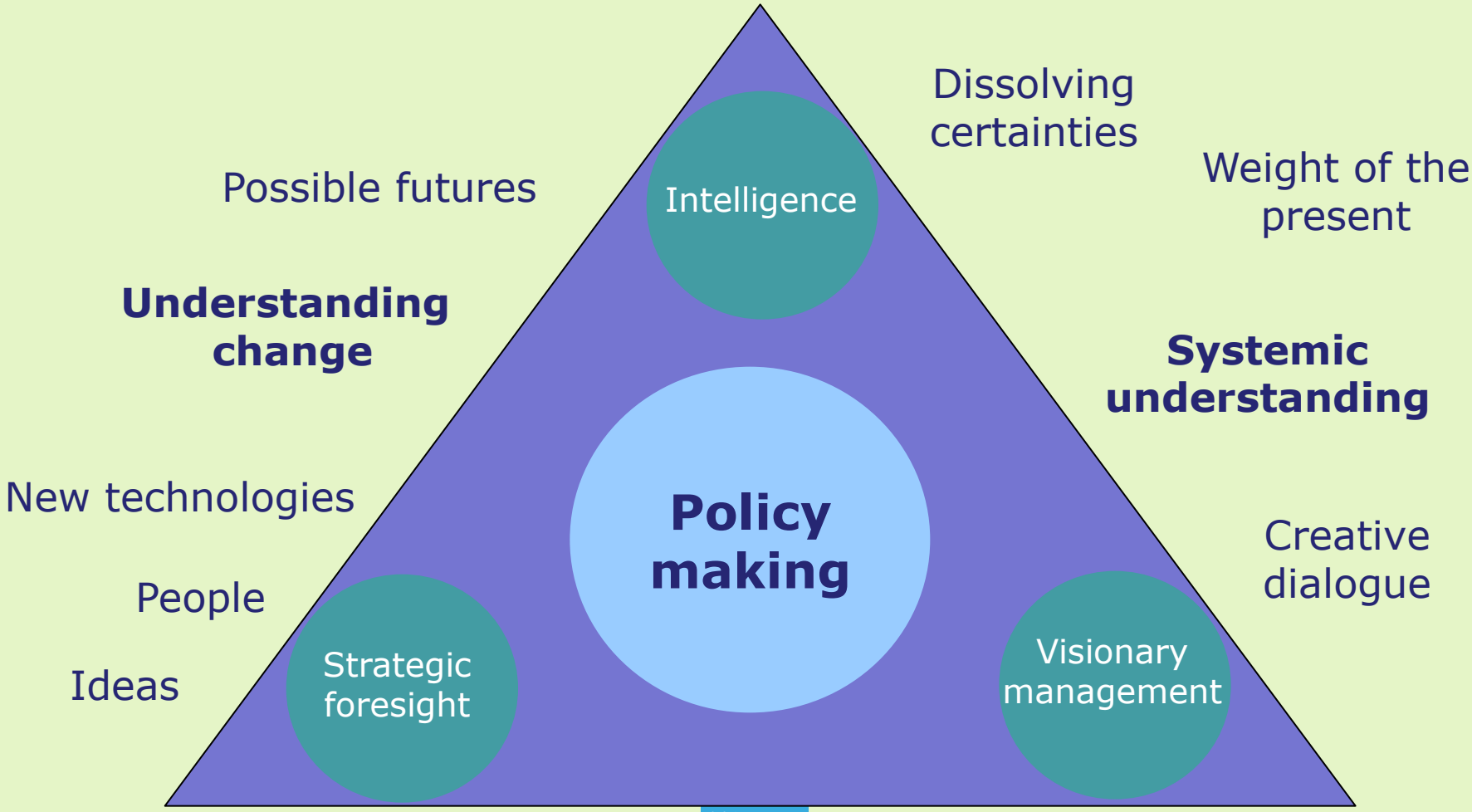
Strategic intelligence



Tuomo Kuosa (2014)

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Foresight methods

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Foresight uses many methods

- in a systematic and structured way
- taken from various traditional disciplines
- steadily combined and modified

Why are formal methods used?

- Aid visualisation of possible futures
- Systematic and transparent (if used properly)
- Help identify knowledge gaps
- Can constitute mixed forums for interaction and communication between various actors
- Legitimise the Foresight exercise

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Categories of foresight methods

Criteria	Methods
1. Methods based on eliciting expert knowledge to develop long term strategies	– Delphi method – Experts panels – Brainstorming – Mindmapping – Scenario analysis workshops – SWOT analysis
2. Quantitative methods that make use of statistics and other data	– Trend extrapolation – Simulation modelling – Cross impact analysis – System dynamics
3. Methods to identify key points of action to determine planning strategies	– Critical/ key technologies – Relevance trees – Morphological analysis

JRC Foresight and horizon scanning activities

Foresight at the JRC – a brief history

- Long tradition of (technology) foresight studies
  - Technology foresight for the *Cellule de Prospective*
  - Foresight studies for research priorities (Ambient Intelligence; future of sustainable manufacturing)
  - Contribution to the development of the knowledge base of foresight as a tool supporting policy making
  - Online Foresight guide FOR-LEARN and International Conferences bringing together academics, public and corporate practitioners

What we are doing

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Foresight at the JRC today

- A new, dedicated unit – DDG 02, the "FBIU Unit" (June 2014)
- 6 foresight studies over the last 2 years
  - Future of standards and standardisation
  - Research priorities for healthy diets
  - Food security
  - Eco-industries, or the transition to a sustainable economy
  - Food safety and nutrition – Future challenges and policy preparedness
  - Analysis of future direction and policy needs of European industry
- *Training (DG RTD)*
- *Conferences (Future oriented Technology Analysis -FTA)*
- *Networking (Government Foresight Network - GFN)*
- *Horizon scanning*

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When should foresight support policy?

- **When critical functions change or are pushed to change:** decline of key industrial sectors, after natural catastrophes, climate change …
- **When stakeholders need to stand behind decisions:** research priorities, regional development …
- **When decisions entail deep or long-term engagement and investments:** infrastructures, healthcare …
- **When innovation needs to be fostered:** adaptation to changed circumstances, rewiring of innovation system
- i.e. most of the times

What we are doing

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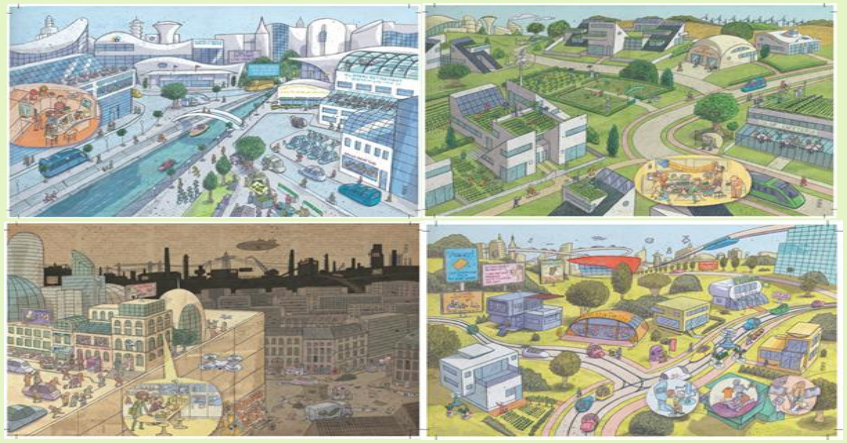
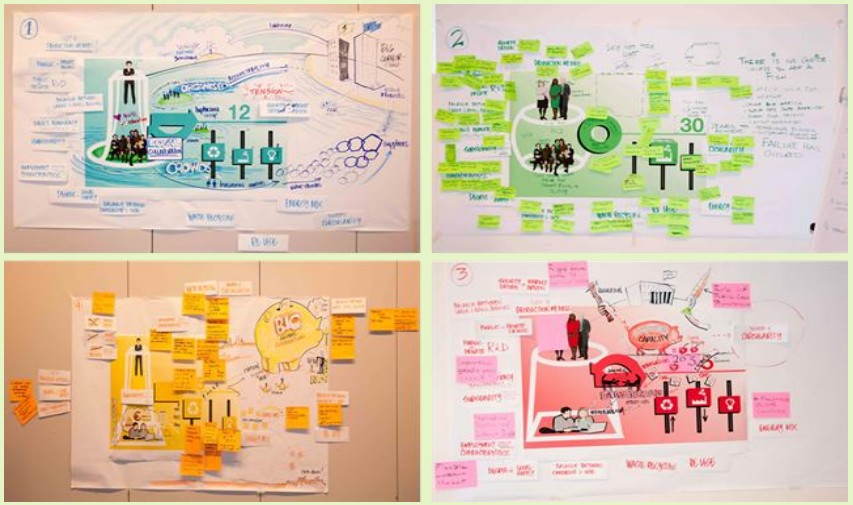
What foresight can do to support policy making





- Inform policy making
- Facilitate implementation
- Stimulate participation of civil society
- Contribute to policy definition
- Enable policy system reconfiguration

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What we are doing

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Foresight on Standards and Standardisation

Question:

"*How will standards facilitate new production systems in the context of European Union innovation and competitiveness in 2025?*"

Customer DG:

DG GROW

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What we are doing

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Interactive Workshops

Expert Panels

6 Interactive Workshops

>70 Experts from Academics, Industry, Standardisation and Policy

18 months process

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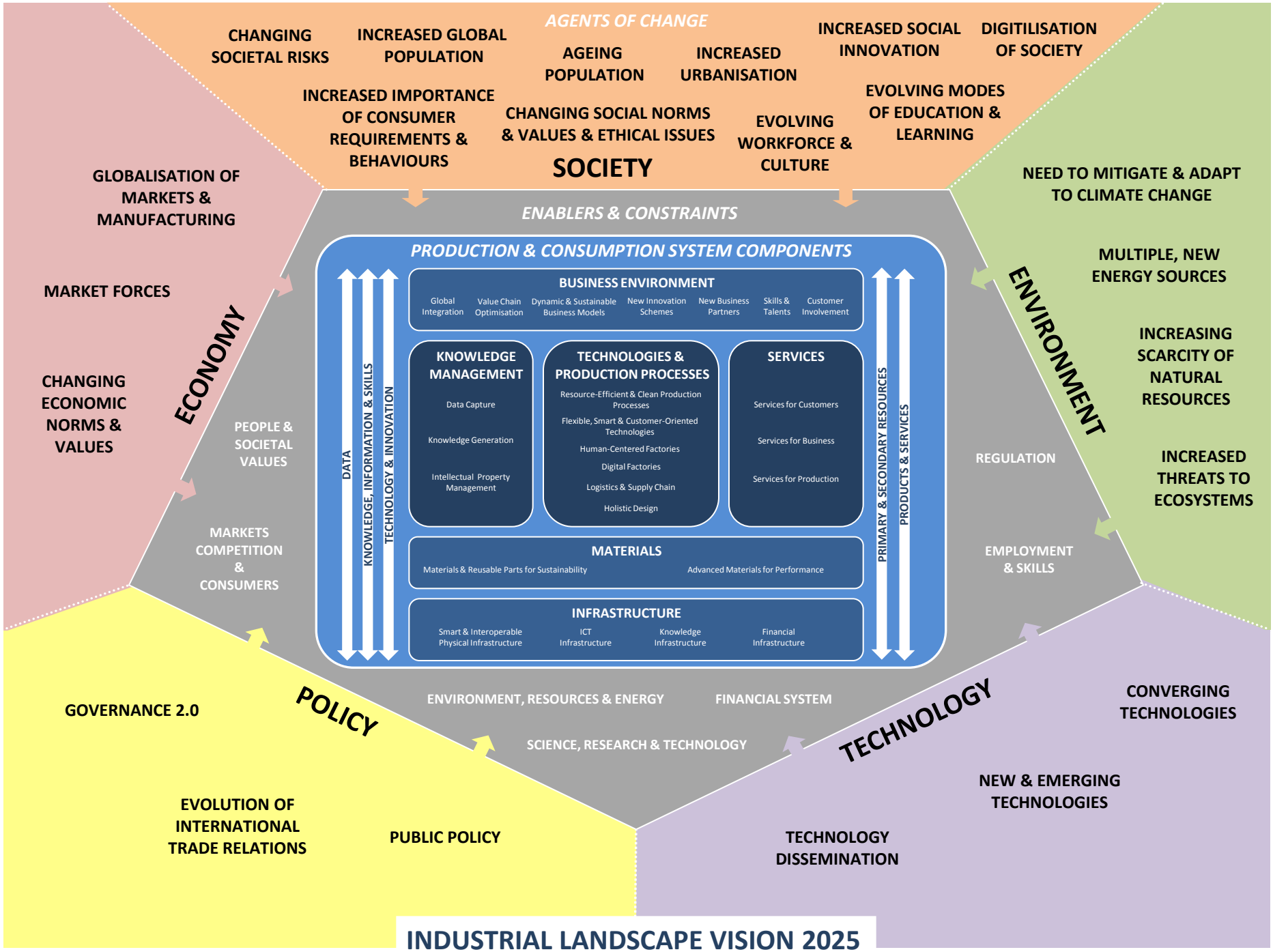

INDUSTRIAL LANDSCAPE VISION 2025

What we are doing

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Example: the vision in the foresight study on standards

Industrial Landscape Vision 2025

In 2025 there will be a globalised economy serving an informed and prosperous global middle class that will require personalised goods and services based on advanced, manufacturing systems enabled by ICT and supplied by European resource efficient and sustainable industries…

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What we are doing

Main Outcomes

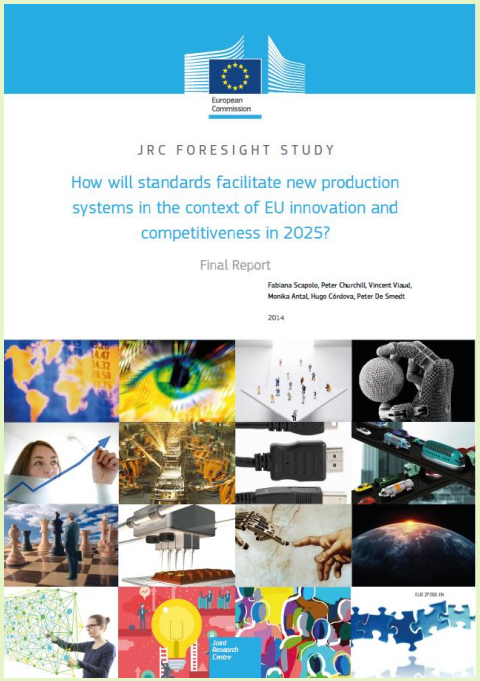
- **Indirect Outcome (At first a tool within the process)**

1. Industrial Landscape Vision 2025 (including a new project to test the ILV 2025)

- **Direct Outcomes**

2. Recommendations for Standards and Standardisation
3. Foresight Template for Standardisation and a report on the study

http://europa.eu/!RT49tD



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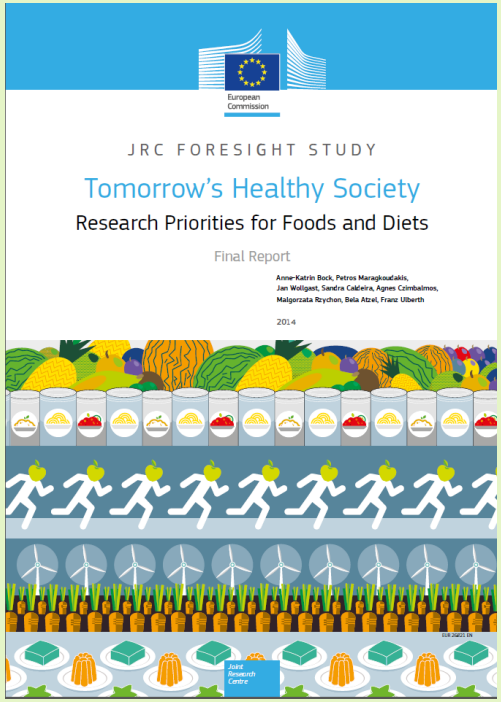
Tomorrow's healthy society – research priorities for food and diets

Objectives

- Identify research priorities that support the provision and consumption of foods and diets for health
- Support the implementation of Horizon 2020



Customer DG: DG RTD

Approach

- Time horizon 2050
- Focus on the EU and EU consumers
- Scenario-based foresight approach
- Three workshops over the course of overall 2 years

Final report available at:

https://ec.europa.eu/jrc/sites/default/files/jrc-study-tomorrow-healthly-society.pdf

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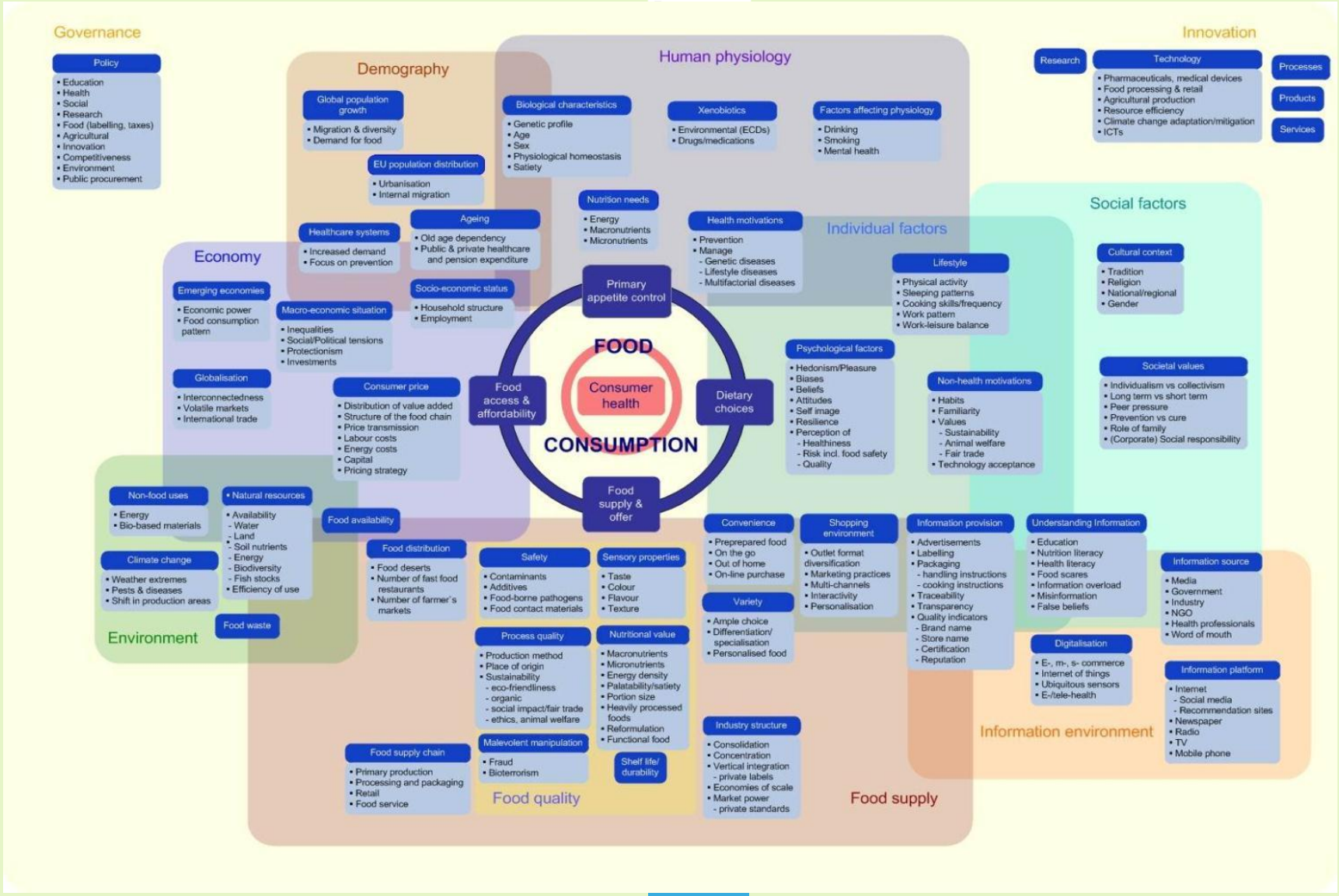
Food consumption map



Four scenarios

Strong community spirit

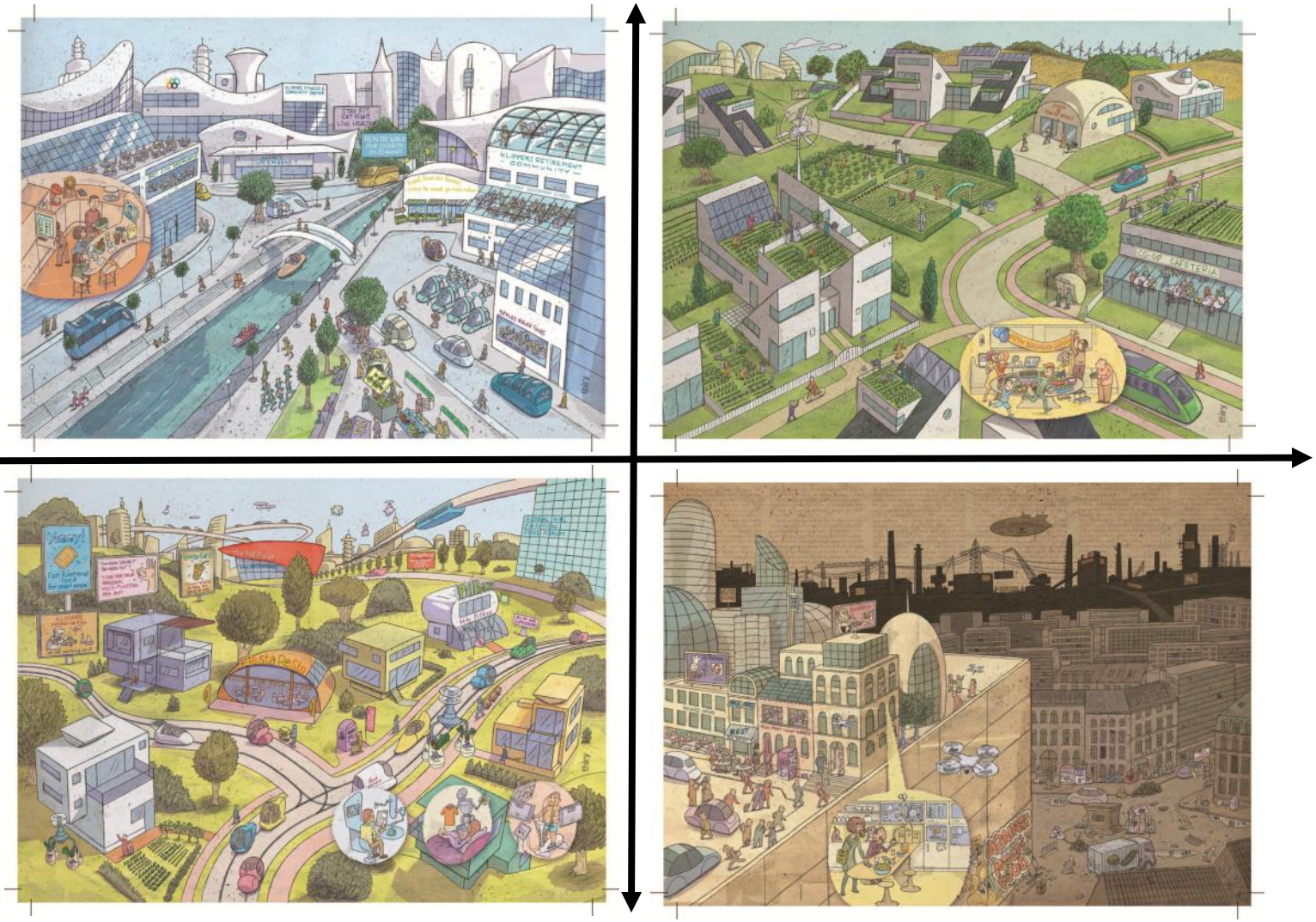
Importance to common goods, rights & social justice

Low agricultural commodity price

Adaptation to climate change, new generation of biofuels

High agricultural commodity price

Scarce natural resources, Climate change, Biofuel competition, at global level



Individualistic society

Individual rights and initiatives valued, self-interest goes before common good

What we are doing

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Tomorrow's healthy society: Research priorities

Towards healthier eating: integrated policy making	Food, nutrients and health: cross-interactions and emerging risks	Making individualised diets a reality	Shaping and coping with the 2050 food system
•Improve the evidence base for adoption of healthier dietary behaviours •Developing a scientific framework for a systems approach to food and nutrition policies •Provide a framework to design, monitor and evaluate policies	•Deepening the understanding of human nutrition: facing the complexity •Anticipation of emerging risks	•Data needs: creation and management of necessary data for enabling individualised diets •Analysing feasibility and impacts of individualised, healthy diets	•Understanding the social role of food •Towards a sustainable food system producing safe, affordable and healthy dietary components •Supporting technologies to meet societal needs

Multi-disciplinary Systems Approach

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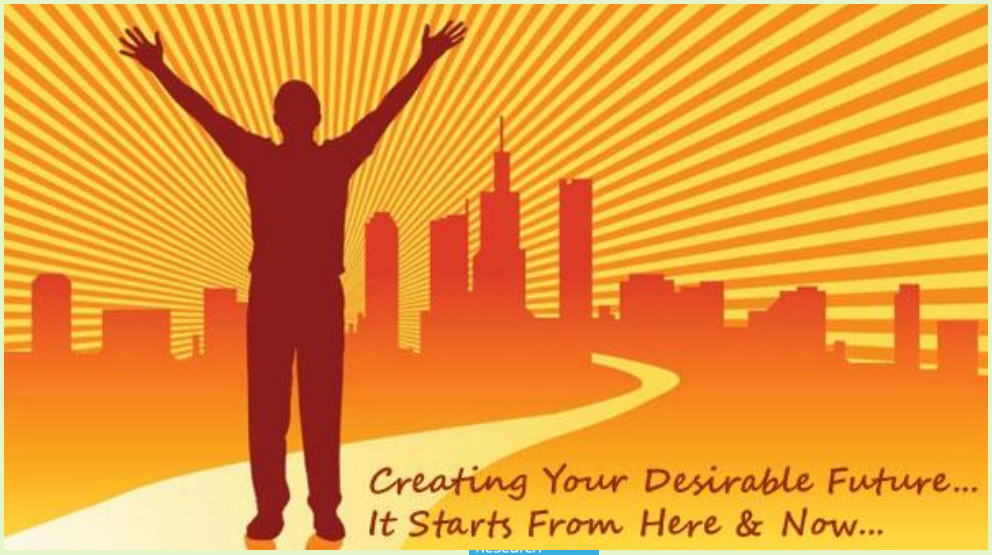
What we are doing

Delivering on EU Food Safety and Nutrition in 2050 – Future challenges and policy preparedness

- **Objectives**
  - To identify possible future challenges to the EU food safety and nutrition policy and regulatory framework
  - To assess whether the current food policy and regulatory framework is sufficiently resilient to deal with the challenges and, if appropriate, identify research needs and develop policy recommendations
- **Approach**
  - Scenario building – following a pilot study carried out by FCEC (Food chain evaluation consortium, two experts and stakeholders workshops
  - Final report planned for quarter 2016
- **Customer DG:** DG SANTE, request of current acting DG

Objectives

- Develop mid- to long-term visions for eco-industries
- Highlight implications for EU policies and research
- Identify relevant trends and drivers
- Place eco-industries within the EU industrial landscape
- Describe realistic desirable futures



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The study process

- Classic scenario building methodology
- Identification and recruitment of "experts"
- 5 Participative workshops
- April 2013 – March 2014
- 41 experts participated, core of 28

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COLLABORATIVE SOCIETY

1 SCENARIO

Global Connected Initiatives is represented by Clement

Shared Circular Strategies is represented by Sophia

2 SCENARIO

FISCAL FRAMEWORK **NOT SUPPORTIVE** OF SUSTAINABILITY

FISCAL FRAMEWORK **SUPPORTIVE** OF SUSTAINABILITY

4 SCENARIO

Local Self-Resilience is represented by Leila

Compact Green Innovation is represented by Leonardo

3 SCENARIO

INDIVIDUALISTIC SOCIETY

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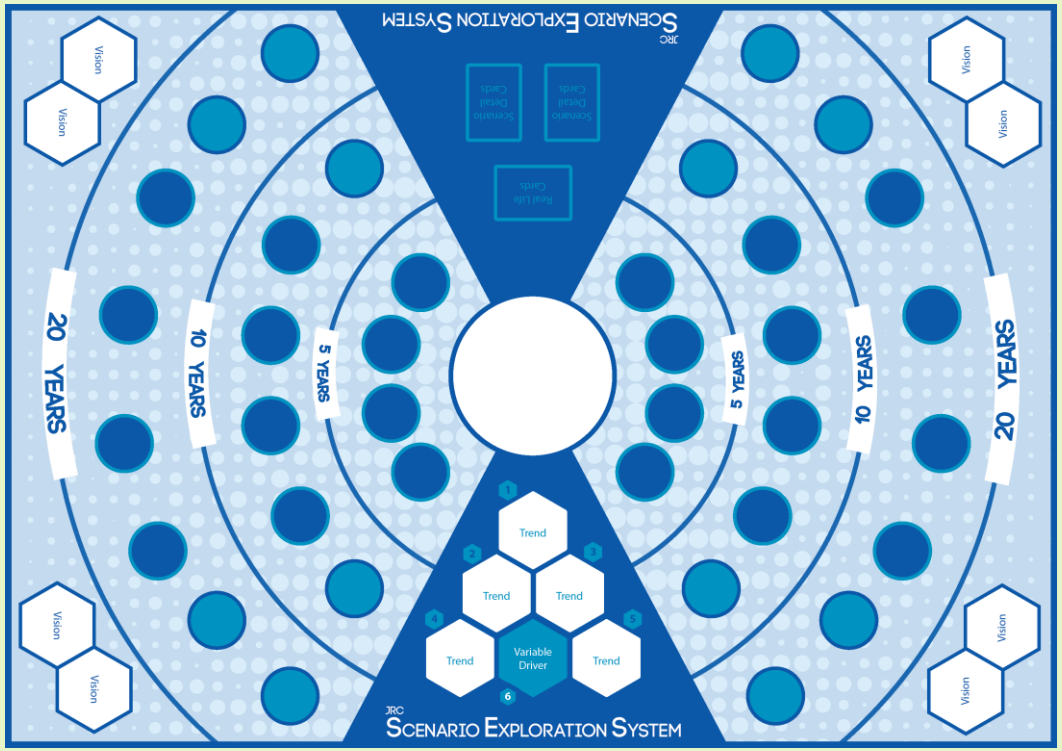
Using scenarios

How we also use the scenarios

- Serious game

The JRC Scenario Exploration System



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JRC Foresight on Global Food Security 2030

- Foresight exercise on EU's role in global food security by 2030
  - Need for identifying a common vision
  - Need for identifying a key challenges and opportunities
  - Need for prioritisation in policymaking

- The Foresight Process
  - Agree on the most crucial drivers of change affecting food security in the future;
  - Reach a consensus on the most likely vision for 2030;
  - Challenge this vision by investigating drivers which could pose major challenges;
  - Analyse current policies and policy needs in terms of responsiveness, flexibility and resilience to future food security needs and challenge.

Main outcomes

By 2030 and beyond, food security will increasingly be considered as securing food supply in response to changing and growing global demand

Food security is therefore not only a global and systemic challenge, *and* an opportunity for Europe to play a role in innovation, trade, health, wealth generation and geopolitics.

Better coordination and coherence at EU level is necessary in order to move from a food security to a food systems approach.

Global Food Security Vision 2030

A world where food security is guaranteed for all on a sustainable base via:

The significant transformation of agriculture production systems (through investments, research and training);

The maintenance of an adequate enabling environment in all rural areas (rural development);

A food system where production and consumption are balanced between local, regional and global levels (market and trade); and

A largely demand-driven food system where responsible consumer behaviour shapes sustainable objectives.

What is a Vision? Desirable, yet plausible, of where we want to be in the future.
Why is it useful? To engage stakeholders in a *visionary* approach in achieving and shaping a specific future.

Horizon scanning activities

- Identify new trends, (new) drivers of change, weak signals, discontinuities, wild cards
- Provide early identification of societal, scientific and technical issues which might require attention by Union Institutions for possible policy intervention
- Develop strategic intelligence allowing the JRC to position itself in anticipation of S&T developments that will affect European policy initiatives and policy options

Horizon scanning activities

- Approach up to the end 2014
  - Periodic bulletin
  - Based on publicly available information
  - Uses JRC S&T know how to assess potential impacts
- We are refocusing our activities…

The EU Policy Innovation Lab

A set of complementary services by bridging disciplines

- Analyse emerging facts and trends and invite policy makers to envisage alternative futures
- Investigate individual and group behaviours and assist policymakers in taking account of them
- Engage with policy makers to explore and implement new approaches (co-designing, prototyping and testing them)

➢ **This combination services provides a unique portfolio of services the EU Policy Innovation Lab is distinctive compared to other initiatives in the public sector**

➢ **Project for VP Katainen on the future of the Sharing economy**


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Agriculture and global food security
Economic and monetary union
Low-carbon economy and resource efficiency
Single market, growth, jobs and innovation
Nuclear safety and security
Public health, safety and security
Thank you
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Assigning methods to Foresight functions

- Foresight methods can address and involve the following functions
  - Diagnosis: scoping of issues at stake and data gathering (environmental scanning; trend extrapolation; structural analysis; morphological analysis and relevance trees)
  - Prognosis: help thinking about possible futures and their implications (scenario building)
  - Prescription: define recommendations about what can be done (scenario building; roadmapping; backcasting; cross-impact analysis)

A Foresight process relies on the combination of different tools. Employ the appropriate mix of methods is crucial to achieve the desired outcomes