Delivering on EU Food Safety and Nutrition in 2050 -

Future challenges and policy preparedness
**Food safety and nutrition**

- **Objective of EU policy and legislative framework:**
  
  „Provision of safe, nutritious, high quality and affordable food“

- High variety of foods available in EU
- Food was never so safe as today
- Single market, harmonised approach, shared legislative framework
- Trends: more information, lower limits, stronger control, more technology ....
THE FOOD CHAIN SYSTEM OVERVIEW

1. Primary production
   - Agriculture
   - Livestock
   - Aquaculture / Fisheries
   - Milk, eggs

2. Harvesting / Slaughtering / Fishing
   - Harvesting
   - Slaughtering
   - Fishing
   - Collecting

3. Processing / Manufacturing
   1st stage:
   - Cutting, milling, brewing, juicing
   2nd stage:
   - Blending, smoking, preservation, mixing

4. Packaging / Labelling
   - Canning
   - Packaging
   - Modified atmosphere
   - Labelling (B2B / retail)

5. Storage
   - Storage length
   - Storage conditions (temperature, atmosphere, humidity)

6. Placing on the market / Distribution
   - Retail
   - Wholesale
   - Direct sale of small amounts of products
   - Internet sale

7. Consumption / Consumer handling
   - Household
   - Catering / Restaurants
   - Home storage

8. Transportation

Inputs:
- Plant reproductive material
- Plant protection products
- Veterinary medicinal products
- Water
- Soil, fertilisers, manure

Chemical ingredients

Imported products

Animal by-products

Waste

Modified from: Commission SWD (2013) 516 final ‘A fitness check of the food chain: State of play and next steps’
FOOD SAFETY IN FUTURE – IS IT FOR GRANTED?

FOOD SECURITY (VOLUME)

CLIMATE CHANGE
RESOURCES - WATER
RESOURCES - SOIL
RESOURCES - FERTILISER
RESOURCES - ENERGY

FOOD SECURITY (VOLUME)

FOOD SAFETY & QUALITY

INTENSIFICATION: TECHNOLOGY, CHEMICALS, BREEDING...

HEALTH (NUTRITION, OBESITY, …)

PREFERENCES (MEAT, “BIO”, NEW TECH)

ECONOMY – PRICE-NEW TECH

DEMOGRAPHICS
Is our food system fit for future challenges?

- Food security studies/foresights: gap in food safety ("integral part")
- Are we sure that our direction/development is right and sustainable?
- Foresight analysis on "Delivering on Food Safety and Nutrition in 2050" to:
  - Identify the critical challenges
  - Assess their impact on food (safety) policy framework
  - Define the potentially critical changes necessary to maintaining the standards of food safety and nutrition
  - Provide insight and guidance towards the development of future policy responses and research needed to support EU policy response to these challenges
PHASE I OF THE FORESIGHT ANALYSIS

Scoping study on “Delivering on EU Food Safety and Nutrition in 2050—Scenarios of future change and policy responses identifying critical drivers and future scenarios”

METHODODOLOGY/Approach:

- Out of box approach, no desired results pre-defined, disruptive futures considered
- Identification of drivers and pre-scenarios
- Test of plausibility
- Definition of unknown – right questions for further work and for research
PHASE I: Drivers and pre-scenarios

- Rapid surge in global trade, high concentration of agri/food industries
- Break-down of global cooperation, multipolar world
- Long-term austerity, shift to private food safety controls
- Severe inequality linked to food insecurity of vulnerable
- Strong shift of consumer preferences – food from alternative production systems
- Wide-spread consumption of high-tech foods
- Global source depletion (absence of minerals, water etc.)
- Global disruptions of agriculture from climate change
- Break-down of consumer trust in food following the emergence of food chain risks (new diseases etc.)

GLOBAL ECONOMY AND TRADE
COOPERATION AND STANDARD SETTING
EU GOVERNANCE (FAILURE)
DEMOGRAPHY AND SOCIAL COHESION
CONSUMER ATTITUDES: ALTERNAT. FOOD CHAINS
CONSUMER ATTITUDES: NEW FOOD TECHNOLOGIES
COMPETITION FOR KEY RESOURCES
CLIMATE CHANGE
EMERGING BIO-RISKS AND DISASTERS
Plausibility of pre-scenarios
(1=not plausible to 6=highly plausible)
PHASE II OF THE FORESIGHT ANALYSIS
(IN COLLABORATION WITH THE JRC)

- Consolidation of scenarios focusing on their interdependences and identification of their impact on food safety and nutrition in the EU
- Assess the capacity of the EU's current food policy instruments (compliance, control and enforcement) to respond successfully to the challenges
- Identify appropriate (optimal) policy responses, transition pathways and the requisite research for the development of a future food safety and nutrition policy and legislative framework necessary to safeguard the high standards of safe, nutritious, high quality and affordable food for EU consumers
DRIVERS USED FOR SCENARIO BUILDING

Social cohesion

EU economic growth

Technology uptake

Global trade

Food values

Agro-food industry structure

Natural resource depletion

Global population growth

Climate change

EU food chain
Scenarios
Local/Regional Food

Global Food

Pharma Food

2050 ?
2016
Global Food

- Liberalised trade and global food chain
- EU one of many players
- Raw materials sourced globally—long complex food chains

- Broad technology acceptance
- Concentration of agro-food industry; mass production of processed, affordable foods

- Diets driven by price, taste, convenience
- Health and Social Inequalities

- Natural resources depletion, global population growth
Local/Regional Food

- Localisation/regionalisation/homesteading
- Technology for sustainable use of resources
- Mix of large entities and localised food production
- High social value of food; diets low in animal protein
- Strong sense of communal values and community responsibility
- Natural resources depletion global population growth
Pharma Food

- High-tech world – maximise Healthy Life Years, Climate Change adaptation, diversity

- "Phood": Pharma & food sectors converge + ICT; concentration

- EU is a strong player worldwide

- Global trade and global food chains

- Health is the main driver for food choices, personalised nutrition

- Social well-being?

- Natural resources depletion, global population growth
## Driver characteristics per scenario

<table>
<thead>
<tr>
<th>Driver</th>
<th>&quot;Global Food&quot;</th>
<th>&quot;Local Food&quot;</th>
<th>&quot;Pharma Food&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Global trade</strong></td>
<td>Full liberalisation</td>
<td>Disrupted and fragmented</td>
<td>Full liberalisation</td>
</tr>
<tr>
<td><strong>EU economic growth</strong></td>
<td>Medium</td>
<td>Decoupled, GDP no longer used as indicator</td>
<td>High</td>
</tr>
<tr>
<td><strong>Agro-food chain structure</strong></td>
<td>Concentration</td>
<td>Diversification, alternative food chains</td>
<td>Concentration</td>
</tr>
<tr>
<td><strong>Technology uptake</strong></td>
<td>High</td>
<td>High with focus on environmental sustainability</td>
<td>High with focus on nutrition &amp; health</td>
</tr>
<tr>
<td><strong>Social cohesion</strong></td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>Food values</strong></td>
<td>Low</td>
<td>High with focus on local production &amp; quality</td>
<td>High with focus on nutrition &amp; health</td>
</tr>
<tr>
<td><strong>Climate change</strong></td>
<td>2°C threshold of temperature increase to be reached by 2050</td>
<td></td>
<td></td>
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<tr>
<td><strong>Depletion of natural resources</strong></td>
<td>Progressive natural resource depletion towards 2050</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>World population growth</strong></td>
<td>World population will increase to about 9 billion by 2050</td>
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**Global Food: prioritised challenges**

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<tr>
<th>Main Prioritised Challenges</th>
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<tr>
<td><em>Differences in the handling of food in third countries due to diverging food safety standards</em></td>
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<td><em>Suitability of the current EU risk assessment procedures for new food ingredients, food products and food-related technologies (including suitability of exposure data and current maximum residue levels)</em></td>
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<td><em>Ability to perform official food-related controls</em></td>
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<td><em>Increased sedentary behaviour and snacking due to changed lifestyles</em></td>
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<td><em>Diets based predominantly on highly processed foods and decreased availability of fresh produce</em></td>
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<tr>
<td><em>Provision of complex quality labelling information to the consumer and opportunity for fraud</em></td>
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# Global Food: Policy & IT challenges (1/2)

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<tr>
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<th>Potential policy options</th>
<th>IT Challenges &amp; Solutions</th>
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<tr>
<td>**Differences in the handling of food in third countries due to diverging food safety</td>
<td>Build efficient food safety standards with implementation details</td>
<td>Publication-maintenance of food safety standards using machine readable expressions</td>
</tr>
<tr>
<td>standards**</td>
<td>Co-regulation or enforced self-regulation by food business operators</td>
<td>Secured mandatory digital tracking and tracing of food flows stored and guaranteed by trusted third parties (machine auditable by the control authorities in case of issues)</td>
</tr>
<tr>
<td>**Suitability of the current EU risk assessment procedures for new food ingredients,</td>
<td>Enhance collaboration between risk assessment bodies</td>
<td>More online collaboration. Compilation-Exchanges of data on analysis &amp; assessment results in order to be able to assess or re-assess on semi-automated way using different assessment models</td>
</tr>
<tr>
<td>food products and food-related technologies (including suitability of exposure data and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>current maximum residue levels**</td>
<td>Horizon scanning to identify vulnerabilities in the supply chain</td>
<td>Secured mandatory digital tracking and tracing of food flows stored by trusted third parties (machine auditable by the control authorities in case of issues)</td>
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<tr>
<td><strong>Ability to perform official food-related controls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-term funding mechanisms</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Expand third country controls</td>
<td></td>
<td>Extension to third countries of the secured mandatory digital tracking and tracing of food flows stored by trusted third parties (machine auditable by the control authorities in case of issues)</td>
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<tr>
<td>Enhancing surveillance to ensure food safety during transportation</td>
<td>Generalisation of intelligent labelling and packing-packaging recording parameters from farm to fork</td>
<td></td>
</tr>
<tr>
<td>Improving traceability using related technologies</td>
<td>RFID, interoperable international standards enforced and secured mandatory digital trace and track stored and guaranteed by trusted third parties</td>
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## Global Food: Policy & IT challenges (2/2)

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<tr>
<td>Increased sedentary behaviour and snacking due to changed lifestyles &amp; Diets based predominantly on highly processed foods and decreased availability of fresh produce</td>
<td>Fiscal measures</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Food reformulation and other incentives</td>
<td>Historisation of digital labelling data in order to show publicly evidences of gradual reformulations</td>
</tr>
<tr>
<td></td>
<td>Zoning and other limitations</td>
<td>Digital mapping of key elements defining the zoning and other limitations linked with expert geographical alert system</td>
</tr>
<tr>
<td></td>
<td>Standards and guidelines for public procurement</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Funding of national and European food and diet related actions</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Improve nutrition education</td>
<td>My connected fridge does give me advices on how to best use its content and what to buy to improve my nutrition balance</td>
</tr>
<tr>
<td></td>
<td>Improve the provision of nutrition information</td>
<td>Digital repository on labelling of product made available to Apps or other devices allowing an automated dietary follow-up for the individual.</td>
</tr>
<tr>
<td>Provision of complex quality labelling information to the consumer and opportunity for fraud</td>
<td>Harmonisation at international level</td>
<td>Harmonisation of exchange structure on labelling. Mandatory digital publication of data from labels (machine readable formats) by the suppliers importing or producing in EU in order to ‘feed’ personal monitoring apps or information systems</td>
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## Local/Regional Food: prioritised challenges

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<td><em>Food safety responsibility in the hands of individual producers</em></td>
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<td><em>Failure to provide appropriate food safety information to the consumer</em></td>
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<td><em>Re-introduction of food waste and organic side-stream products in the food chain</em></td>
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<tr>
<td><em>Temporary shortages of fresh produce and food poverty in a self-sufficient food system</em></td>
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## Regional Food: Policy options & IT challenges (1/2)

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<tr>
<td>Food safety responsibility in the hands of individual producers</td>
<td>Expansion of the scope of the General Food Law and hygiene regulations and the related control implications to individual food producers</td>
<td>Effective digital realtime traceability including product treatments. Keeping buyer's contact is important to manage potential fragmented recalls</td>
</tr>
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<td></td>
<td>Establishment of a list of &quot;risk&quot; products</td>
<td>Publication using machine readable format to feed automatically information systems for producers and consumers (My fridge is now an information system and can alert me based on its content)</td>
</tr>
<tr>
<td></td>
<td>Food safety education</td>
<td>Targeted hygiene education linked to my purchased products (either from producers or from automatic recognition of product stored in home storage)</td>
</tr>
<tr>
<td>Failure to provide appropriate food safety information to the consumer</td>
<td>Social networks and ICTs</td>
<td>Reports cultivation practices, advice consumer on hygiene practices (from more central knowledge bases) and build consumer to producer relationship feedback in a social network way</td>
</tr>
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## Regional Food: Policy options & IT challenges (2/2)

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<tr>
<td><strong>Re-introduction of food waste and organic side-stream products in the food chain</strong></td>
<td>Expansion of the scope of General Food Law and feed hygiene regulations to individual producers</td>
<td>Electronic register of small feed producer (like the Blue Number of International Trade Centre)</td>
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<td>Communal food waste handling or recycling centres</td>
<td>Localisation of facilities with information of food waste recycling capabilities</td>
</tr>
<tr>
<td></td>
<td>Proactive education initiatives</td>
<td>Online education capacities</td>
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<tr>
<td><strong>Temporary shortages of fresh produce and food poverty in a self-sufficient food system</strong></td>
<td>Emergency mechanisms for food re-distribution</td>
<td>Supply-demand alert systems shared between local producers and neighbouring regions ones</td>
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# Pharma Food: prioritised challenges

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<td><em>Potential drawbacks of personalised nutrition and &quot;phoods&quot;</em></td>
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<td><em>Ability to perform official food-related controls</em></td>
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<td><em>Suitability of the current EU risk assessment procedures for new food ingredients, food products and food-related technologies (incl. suitability of exposure data and maximum residue levels)</em></td>
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## Pharma Food: policy options & IT challenges

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<td><strong>Potential drawbacks of personalised nutrition and &quot;phoods&quot;</strong></td>
<td>Adapting or creating an effective regulatory framework</td>
<td>Secured mandatory digital tracking and tracing of ingredients and their combination stored by trusted third parties (machine auditable by the control authorities in case of issues)</td>
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<tr>
<td>Redefining health and nutrition claims</td>
<td></td>
<td>Expansion of the existing health and nutrition platform</td>
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<tr>
<td><strong>Ability to perform official food-related controls</strong></td>
<td>Regulating &quot;phood&quot; manufacture: &quot;Phood licence&quot;</td>
<td>Online training and licencing</td>
</tr>
<tr>
<td>Post-market monitoring and &quot;nutrivigilance&quot; controls</td>
<td></td>
<td>Nutrivigilance database open to public to report issues and consult existing adverse effects</td>
</tr>
<tr>
<td>Expand third country controls</td>
<td></td>
<td>Traceability from ingredient fabric to fork potentially linked with the nutrivigilance database</td>
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<tr>
<td><strong>Suitability of the current EU risk assessment procedures for new food ingredients, food products and food-related technologies (incl. suitability of exposure data and maximum residue levels)</strong></td>
<td>Dealing with cumulative effects and long term exposure</td>
<td>Personal monitoring of ingredients purchased and absorbed linking automatically to knowledge base and 'nutrivigilance' systems to trigger alerts and warnings. Link with personal electronic medical file possible.</td>
</tr>
</tbody>
</table>
Conclusions

- The legislative framework governing food safety in the EU is robust, effective and efficient

- Action needed for improving the effectiveness of EU nutrition policies

- Harmonisation of risk assessment approaches to allow for the inclusion of other legitimate factors such as health benefits and socio-economic consequences

- A suitable and harmonised metric for benchmarking and monitoring food safety performance in the EU needs to be established

- An effective early warning system for emerging hazards at EU level is missing

- Adaptation of official control and inspection services to future needs

Investment in providing food safety and nutrition education to the public
Conclusions at IT level

-No need for breakthrough technologies: all the building blocks to allow the scenario described are existing

-Capacity of the IT business and ecosystem to create adapted solutions and new business models is real

-Legal base to enable/authorise these systems to work need to be elaborated, created and adopted

-Further effort to harmonise and standardise data structure and process in the food domain are needed even if in good tracks (UN/CEFACT)
Full study can be found here.

Thank you for your attention!