

# Report: FOOD VISIONS 2030 workshop

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Rapporteurs: Krijn Poppe MSc., Wageningen University & Research  
Dr. Nikola Schulz, Project Management Juelich

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## ANNEX

### Clean copy of tables on Challenges, opportunities and R&I interventions

#### 1. Background and short introduction to workshop and tasks

FOOD VISIONS 2030 was a workshop organised on October 12, 2016 in Brussels by DG Research and Innovation together with the EU Policy Lab of the Joint Research Centre to discuss megatrends in society and identify relevant research and innovation actions. The workshop was arranged in an interactive way with the speakers, external experts and rapporteurs of the Food 2030 Conference on October 13. Participants could choose one of the four themes of their preference and worked with the same group of colleagues for an afternoon. The group work started with prioritising a number of given mega trends. In the next step relevant challenges and research and innovation actions were identified. The work was concluded by one minute 'elevator pitches' as if the Commissioner of RTD would be present. This was followed by a short discussion. This note reports the main outcomes of the workshop.

#### 2. Outcomes of group work

##### 2.1. Priorisation of trends

In the first task the groups were asked to prioritise the 18 trends using a matrix with two axes: one depicting the level of awareness/knowledge (well understood – underestimated/ misunderstood) and the second depicting the impact (low – high impact). Of special interest were trends that were underestimated/ misunderstood and had high impact. The table below shows the trends that fell into this category (marked in light blue). In the next part of the workshop groups chose some of the prioritised trends for further discussion (marked in dark blue).

Trend	Nutrition	Climate	Resource efficiency	Empowerment Communities
1. Rise of the consumer class				
2. Growing inequality – widening gap between the rich and poor				
3. Continued population growth, youth bulges and ageing population				
4. Increasing automation of work				
5. New forms of employment & changing organisational structures				
6. Increasing access to & diversification of education				
7. Urbanisation & growth of mega cities				
8. Transnationalisation & changing forms of governance				
9. Shifting economic power towards the East and South				
10. Rapid technological change & convergence				
11. Increasing complexity of security				
12. Competing values and lifestyles				
13. Changing forms of media				
14. Increasing prevalence of NCDs & neurological diseases				
15. Growing global health divide				
16. Increasing social and political significance of migration				
17. Rising demand for resources				
18. Increasing complex effects of climate change				

(in light blue: trends chosen in the category underestimated/ misunderstood and high impact; in dark blue: trends that were chosen for further discussion by the groups)

Although not all prioritised trends could be discussed due to limited time, the following trends showed the highest overlap for prioritisation:

- 10. Rapid technological change & convergence - prioritised by all 8 groups
- 17. Rising demand for resources and
- 18. Increasing complex effects of climate change – both prioritised by 6 out of 8 groups
- 3. Continued population growth, youth bulges and ageing population - prioritised by 5 out of 8 groups.
- 4. Increasing automation of work and
- 7. Urbanisation & growth of mega cities - both prioritised by half of the groups.

## 2.2. Opportunities, challenges and respective R&I interventions

This section reports Opportunities or Challenges and the potential Research and Innovation actions related to those opportunities or challenges, for the four themes: nutrition, climate change, resource efficiency and empowerment of communities. Each theme was discussed by two separate groups.

### 2.2.1. Nutrition

#### Nutrition Group 1

*Trend 2 - Growing inequality – widening gap between the rich and poor*

*Trend 7 Urbanisation & growth of mega cities*

*Trend 17 Rising demand for resources*

*Trend 3 Continued population growth, youth bulges and ageing population*

O/Ch: Availability and access of food

R&I:

- Urban farming/ kitchen farming > scaling up, affordability, distribution (FoodBnb in addition to AirBnb)
- Research on inclusive neighbourhood
- Research on food waste and its value

*Trend 10 Rapid technological change & convergence*

*Trend 12 Competing values and lifestyles*

*Trend 13 Changing forms of media*

O/Ch:	Understanding and enabling consumer motivation and change
R&I:	<ul style="list-style-type: none"><li>➤ research in social media</li><li>➤ understand consumers lifestyle and food</li><li>➤ wants and behavior</li><li>➤ models for effective consumer behavior change (vis-à-vis info overload)</li><li>➤ engage with citizens</li></ul>

*Trend 3 Continued population growth, youth bulges and ageing population*

*Trend 14 Increasing prevalence of NCDs & neurological diseases*

O/Ch:	The role of nutrition and a healthy and sustainable lifestyle
R&I:	<ul style="list-style-type: none"><li>➤ understand individual nutrition needs for older consumers (population subgroups)</li><li>➤ smart technology to make the right choices</li></ul>

## **Nutrition Group 2**

*Trend 14 Increasing prevalence of NCDs & neurological diseases*

O/Ch:	Challenge: reduce the burden; reach the “right” people; change behavior of consumers/ of the supply chain; do not just speak about food, speak about lifestyle, physical activity Opportunity: healthy living and ageing; sustainable life
R&I:	<ul style="list-style-type: none"><li>➤ research on improved composition of food (which ingredients do you need (primarily sugar, salt, fats)) in order to adopt products in order to reduce the impact?</li><li>➤ research on how to change behavior (persuade people to do something differently &gt; referring on existing experiences</li><li>➤ research on the incentives for the supply chain</li><li>➤ research on what a healthy and sustainable diet is</li></ul>

*Trend 18 Increasing complex effects of climate change*

*Trend 17 Rising demand for resources*

O/Ch:	Challenge: more sustainable agriculture and production; getting people to shift to a more sustainable diet; adapting the production and processing; adaptation in geographical regions; impact on food
R&I:	<ul style="list-style-type: none"><li>➤ what is healthy and sustainable diet?</li><li>➤ research on indicators for sustainable production in a comprehensive way; and on consumption (reduction of waste) in a comprehensive way</li><li>➤ research on the nutritional balance of food in case of changes in production (and consumption) as a result of climate change and social change</li></ul>

*Trend 10 Rapid technological change & convergence*

*Trend 5 . New forms of employment & changing organisational structures*

O/Ch:	Challenge: holistic approach; merging convenience and healthiness; Opportunity: use new technologies to influence people’s decisions
R&I:	<ul style="list-style-type: none"><li>➤ how to undertake consumer engagement to create food dialogues, how to reach groups , how to dialogue, how to interact; what technology could help them? Do the new tools work?</li><li>➤ Basic research on environmental/ health impact of the societal and technological changes</li><li>➤ What is healthy and sustainable?</li><li>➤ Innovation research</li></ul>

## 2.2.2. Climate

### Climate Group 1

*Trend 7 Urbanisation & growth of mega cities*

*Trend 8 Transnationalisation & changing forms of governance*

O/Ch:	Changing governance structures and growth of cities and mega-cities challenge: globally agreed standards; innovative responsive city regional level governance
R&I:	<ul style="list-style-type: none"> <li>➤ Increasing our knowledge on corporate responsibility mechanisms and targets (stewardship) of the agro-food industry and the impact thereof on food systems in different parts of the world; Are there fundamental problems with corporate standards? What can we learn from specific standards to apply in other regions?</li> <li>➤ What can the role of the cities and other self-governing communities be in the above?</li> <li>➤ What is the role and limitation of certification standards (e.g. gluten-free) on food and sustainability and climate impact?</li> </ul>

*Trend 2 Growing inequality – widening gap between the rich and poor*

*Trend 16 Increasing social and political significance of migration*

O/Ch:	Inequality links through multiple pathways with migration Challenges: food insecurity; disruption to agri-food production and supply chains; perpetuation of resource-intensive aspiration fueling unsustainability Opportunities: using food as an entry point for addressing broader inequalities; migration could help adhere labor issue caused by demographic changes
R&I:	<ul style="list-style-type: none"> <li>➤ methodologies for full cost accounting (environmental and social impacts)</li> <li>➤ methods for progressive ... of ...</li> <li>➤ research into policy options for addressing inequality in food systems</li> </ul>

*Trend 3 Continued population growth, youth bulges and ageing population*

*Trend 6 Increasing access to & diversification of education*

O/Ch:	Population growth increases resource pressure Challenge: youthful and ageing population create different labour market problems and have different nutritional requirements Opportunity: older people may be more climate and health conscious while new education formats provide opportunities for learning about sustainability along whole life course
R&I:	<ul style="list-style-type: none"> <li>➤ opportunities to incorporate sustainability of food into school (all the way through to post graduate curricula)</li> <li>➤ improve understanding of education translates into behavioral change &gt;going beyond seeing people as consumers with greater focus on values (this helps to guide to first point)</li> <li>➤ improve understanding of ageing population nutrition requirements (i.e. how they differ in types of food demanded) and net climate impacts</li> </ul>

### Climate Group 2

*Trend 16 Increasing social and political significance of migration*

*Trend 9 Shifting economic power towards the East and South*

*Trend 11 Increasing complexity of security*

O/Ch:	We have a huge complex challenge and a huge mighty power: choices Global shift of economy and governance; China's rise impacting Africa and impact on global consumption; -need to raise awareness and understanding of new context; -related education and awareness; -new role of Europe as no longer ... of the world; -role of states to protect and provide. open access to big data infrastructure; -cultural dimension.
R&I:	<ul style="list-style-type: none"> <li>➤ Impacts of Climate change on political and economic disruptions: food-climate policy</li> <li>➤ Research on cultural social, political dimensions of choices and policies</li> <li>➤ Modeling research on the resilience of food systems, consistency</li> <li>➤ The global shifts and trends/multiscale/multicriteria analysis</li> </ul>

- Organisation and public access of data
- Role games with decision makers and stakeholders
- Scenario building

*Trend 10 Rapid technological change & convergence*

*Trend 18 Increasing complex effects of climate change*

O/Ch: Climate Change impacts food ... environmental degradation; Food impacts Climate and environment  
 Opportunity of rapid technological change and development on adaptation to Climate Change and understanding (modeling of change)  
 Rapidly evolving context is difficult  
 Technological adaptation and understanding of long term impacts  
 Open science and education is key  
 Systemic change of climate change

- R&I:
- Agile adaptation of agriculture/food production modelling/ research and data
  - Deeper understanding of cascading/systemic effects of climate change and environmental degradation
  - Better data on these disruptions and modeling /prediction
  - Impact of consumption/food choices on GHG emissions (and waste, and transport)
  - Integrated food systems assessment
  - Link between research and policy making decisions, choices, transparency

### 2.2.3. Resource efficiency

#### Resource efficiency Group 1

*Trend 10 Transnationalisation & changing forms of governance*

*Trend 17 Rising demand for resources*

*Trend 18 Increasing complex effects of climate change*

O/Ch: Re-engineering production of a resource-limited world:

- R&I:
- Understanding and working out how to better exploit the microbiome
  - Broaden the horizon and impact of genetics, underpinned by clear policy environment
  - Understanding citizens' perceptions of innovations in food and agriculture
  - Building on natural capital should be part of standard agriculture practice (vs. industrial system)
  - Stronger focus on proving that applications work at scale – not just generating innovation

*Trend 4 Increasing automation of work*

*Trend 10 Transnationalisation & changing forms of governance*

*Trend 18 Increasing complex effects of climate change*

O/Ch: Re-programming the supply-chain:  
 Zero-waste, moving towards circular models, automation, data exploitation and artificial intelligence, personalization in food, feeding the emerging middle-class affordable, nutritional and safe food, building in resilience particularly for climate change.

- R&I:
- Driving a “zero-waste, circular economy” in food
  - Turning huge data sets into effective knowledge for production and supply
  - policy instruments to ensure open access to data
  - research on what is an affordable, safe, nutritious food and what consumers want
  - Research to evolve local political processes based on a food system approach (e.g. transdisciplinary learning)

*Trend 1 Rise of the consumer class*

*Trend 10 Transnationalisation & changing forms of governance*

*Trend 17 Rising demand for resources*

O/Ch:	Changing what we eat: Personalized nutrition, shift protein sources, move from focus on calories to nutrition across life stages, role of social norms and how to shift the diet.
R&I:	<ul style="list-style-type: none"><li>➤ Research on nutritional requirements across age groups and gender and how to meet it across the world</li><li>➤ understanding consumer behavior with regard to food and how to influence, also related to social norms</li><li>➤ research on novel protein sources for humans and animals (e.g. mussels vs fish)</li></ul>

**Resource efficiency Group 2**

*Trend 7 Urbanisation & growth of mega cities*

O/Ch:	Challenge due to separation of agriculture, production and consumption as well as economy of scale Opportunity: pooling of resources, more circularity
R&I:	<ul style="list-style-type: none"><li>➤ Supporting circular systems, collective approaches across disciplines</li><li>➤ To pool resources, also regulations (e.g. food safety regulations) need to be horizontal and span across circular value chains (“the new green deal”)</li><li>➤ What will food look like in 2030? Diversity in cities, lifestyles, competences of the population, what influence will migration and insecurity have (food security)?</li></ul>

*Trend 18 Increasing complex effects of climate change*

O/Ch:	Challenge of resilience and how to produce food with less land? Acidification of the oceans and impact on fisheries? Food systems inability to adapt to quick change. Difficulties to pool research resources and get enough funding for complex research. Lack of information
R&I:	<ul style="list-style-type: none"><li>➤ Open access of data, better exploit research results</li><li>➤ supporting networking</li><li>➤ Modelling</li></ul>

**2.2.4. Empowerment of communities**

**Empowerment communities Group 1**

*Trend 13 Changing forms of media*

O/Ch:	“Food culture” is threatened by Other businesses that come into food sector (mainly distribution). This can lead to altered habits and increased disengagement with food purchasing, to the misconception of buying food as hurdle and the push for “easy” products (convenient, frozen ..)
R&I:	<ul style="list-style-type: none"><li>➤ Research on information development/ education to boost awareness of citizens on choices as consumers and their impacts (on environment, nutrition...)</li><li>➤ Explore new ways to make science and facts about food a more regular issue in media (at several levels: community, research, policy...) in order to have maximum and effective outreach on a regular basis. Changing cultures and paradigms is long-term.</li></ul>

*Trend 8 Transnationalisation & changing forms of governance*

O/Ch:	Need for new forms of dialogue and trust among actors and knowledge exchange. Need for resource/ more sustainable practices/ circular ways from producing to consuming to re-use of waste
R&I:	<ul style="list-style-type: none"><li>➤ Developing data and information infrastructure to enable optimal decision making at local level (e.g. capture local trends and interactions on social/economic/environmental level)</li><li>➤ Research to evolve local political processes based on a food system approach (e.g. transdisciplinary learning)</li></ul>

*Trend 7 Urbanisation & growth of mega cities*

O/Ch: | People in the cities are at risk to loose connection to food as well as connection to nature/rhythms/seasons. Knowledge is lost how food is produced and delivered. This might result in “killing” of the food culture and locking people in the cities hindering opportunities/knowledge/interest to go rural and grow food/ get connected to food system themselves

## Empowerment communities Group 2

*Trend 10 Transnationalisation & changing forms of governance*

*Trend 4 Increasing automation of work*

*Trend 13 Changing forms of media*

O/Ch: | Taking advantage of technologies (e.g. digital, communication, robotics) to empower communities by strengthening regional food systems or by increasing stakeholder participation

R&I: |   
 ➤ Bring different disciplines together  
 ➤ Enabling integration of technologies from other industries to food systems

*Trend 14 Increasing prevalence of NCDs & neurological diseases*

*Trend 15 | Growing global health divide*

O/Ch: | How to enable healthy diets for all? How to allow cross-fertilization originating from other industries?

R&I: |   
 ➤ Understanding links between food and health and education  
 ➤ Technological solutions to improve nutritional security, necessary social empowerment underpinned by education  
 ➤ Understanding trade-offs between food safety and quality

*Trend 5 New forms of employment & changing organisational structures*

*Trend 6 Increasing access to & diversification of education*

O/Ch: | Need to create jobs supported by resilient education systems. There is a mismatch between education system and customer/society needs.

R&I: |   
 ➤ Investigate drivers of educational systems (e.g. access to education, job-finding..)  
 ➤ Foster engagement and commitment of all stakeholders and linking social, technological and educational dimensions

### 2.3. Key messages (pitches)

The key messages that were pitched by the different groups can be summarized in the following statements, which can be interpreted as the main take-home messages from the workshop:

*On nutrition:*

- Improve the understanding of consumer behavior and of enabling consumer change; engage with consumers also to better understand their differences and lifestyles
- Models for effective consumer behavioral changes in relation to availability of and access to food and the role of food in a healthy life style
- Need to lower the disease burden: how to reach people and influence the supply chain and the composition of food
- Increased prevalence of NCDs and complex effects of climate change
- The effect of social and technological changes
- Indicators of sustainability for a more sustainable agriculture and production
- Impact of climate change and other developments on food safety

*On climate:*

- Environment and climate change have an impact on food security and vice versa: food production has impact on environmental degradation : there is a need to understand systemic interactions
- Food production and consumption have an influence on climate (by GHG), so there is a need to make changes in both production and consumption
- What is the impact of consumption and food choices (e.g. transport of food) on the environment?
- What mix of policy mechanisms (regulatory, economic...) is effective, legal and feasible to foster a change?
- There are different levels of governance necessary (city-level/ national level/ intergovernmental/ non-state actors like industry), what is the best mix and how to organise this?
- What form of education and awareness raising is needed for regulatory actions?
- Research is needed on cultural, social and political dimensions of food choices
- The focus should turn from research on consumers to research on effective policy mechanisms

#### *On resource efficiency:*

- Resource efficiency is crucial for food security
- To achieve resource efficiency there is a need to tackle the value chain as circular system in a collective approach
- To make food production efficient on the long-run, it is important to not only look at specific aspects or stages of the value chain (e.g. in food safety regulations)
- Re-engineer production (production in a resource-limited world, increase biodiversity, change the processing system) and use true prices for natural capital.
- Reprogramme the supply chain (from using big data sets to knowledge how to exploit the data)
- Change eating (from a culture of calories to a culture of nutrition)
- Create space for innovation and real experimentation for the food sector

#### *On empowerment:*

- “Make our food great again”
- Food is about people; Research & Innovation should boost food culture and capture multi-dimensional aspects as well as connect all people
- Strengthen multi-disciplinarity: bring in/integrate technologies from other sectors into the food area and use their advantages
- Enable “healthy diets for all” by investigating and using the link/interactions between food-health-education
- Social empowerment and education:> educational systems should be driven by how to make a change (create and implement changes) and how to engage people and all stakeholders

## **2.4. Discussion and comments by participants**

The group work and pitches were followed by a short discussion. Main points raised:

- It is important to unlock what is already there – by networking, exchange, bringing different capacities together (e.g. some themes that were discussed are already worked on in JPI FACCE)
- In the shift from the old to the new world technological solutions are important but also cultural differences have to be considered
- We should use the power of communication and better use of education systems; “virtual reality” to bring bioeconomy /change towards a bioeconomy into perception in schools; Slogan: “make education great again”
- Facing a perfect storm (environment, human, food...) – we need to change ways of handling; what choices are necessary



- Interventions necessary mostly at systems level; cross-cutting should happen not only in the R&I context but also important to bring actors and different area together
- Action research is needed to change the system, citizen science and public-private partnership on some topics are useful.
- Global collaboration is needed
- Attention has to be paid to food trends, such as 'superfoods'.

**ANNEX to Report FOOD Visions Workshop – FOOD2030 conference**

**CLEAN COPY of intervention sheets (opportunities and challenges/ R&I interventions/ key message pitch)**

Group NUTRITION (1), Meijer

Trend	Opportunity or challenge	R&I intervention	attribute
2, 7, 17, 3	Availability and access of food	-Urban farming/ kitchen farming > scaling up, affordability, distribution (food BNB) -Research on inclusive neighbourhood -Research on food waste value	Sustainable, resilient, inclusive, responsible
10, 12, 13	Understanding and enabling consumer motivation and change	-research in social media -understand consumers lifestyle and food >wants and behavior -models for effective consumer behavior change (vis-à-vis info overload) >engage with citizens	Diverse, inclusive, responsible
3, 14	The role of nutrition and a healthy and sustainable lifestyle	-understand individual nutrition needs for older consumer (population subgroups) -smart technology to make the right choices	Diverse, competitive, inclusive, responsible + accountable

Key message pitch:

- Improve understanding consumer behavior and enabling consumers change, engage with consumers, better understand their differences and lifestyle
- Models for effective consumer behavior changes in collaboration with the consumer

Group NUTRITION (2), Eiden

Trend	Opportunity or challenge	R&I intervention	attribute
14 (health impacts)	<p>Challenge:</p> <ul style="list-style-type: none"> <li>-reduce the burden</li> <li>-reach the “right” people</li> <li>-change behavior of consumers/ of the supply chain</li> <li>-do not just speak about food ; speak about lifestyle, physical activity</li> </ul> <p>Opportunity:</p> <ul style="list-style-type: none"> <li>-healthy living and ageing</li> <li>&gt;sustainable life</li> </ul>	<ul style="list-style-type: none"> <li>-<u>research on improved composition of food</u> (which ingredients do you need (primarily sugar, salt, fats)) in order to adopt products in order to reduce the impact?</li> <li>-<u>research on how to change behavior</u> (persuade people to do something differently &gt;referring on existing experiences</li> <li>-research on the incentives for the supply chain</li> <li>-research on what a healthy and sustainable diet is</li> </ul>	Sustainable
18, 17	<p>Challenge:</p> <ul style="list-style-type: none"> <li>-more sustainable agriculture and production</li> <li>-getting people to shift to a more sustainable diet</li> <li>-adopting the production and processing</li> <li>-adaptation in geographical regions</li> <li>-impact on food...</li> </ul>	<ul style="list-style-type: none"> <li>-what is healthy and sustainable diet?</li> <li>-research on indicators for sustainable production in a comprehensive way; and on consumption (reduction of waste) in a comprehensive way</li> <li>-research on the nutritional balance of food in case of changes in production (and consumption) as a result of climate change and social change</li> <li>&gt;other than suppl. ...</li> </ul>	sustainable
10, 5	<p>Challenge:</p> <ul style="list-style-type: none"> <li>-holistic approach</li> <li>-merging convenience and healthiness</li> </ul> <p>Opportunity:</p> <ul style="list-style-type: none"> <li>-use new technologies to influence people’s decisions</li> </ul>	<ul style="list-style-type: none"> <li>-how to undertake to consumer engagement create food dialogues, how to reach groups , how to dialogue, how to interact; what technology could help them? Do the new tools work?</li> <li>-basic research on environmental/ health impact of the societal and technological changes</li> <li>-what is healthy and sustainable?</li> <li>-innovation research...</li> </ul>	sustainable

Key message pitch:

- Increased prevalence of NCDs and complex effects on climate change as well as social and technological changes
- Several challenges for the future...
- Need to lower the burden, how to reach people and the supply chain; composition of food; how to change behavior; more sustainable agriculture and production; impact on food safety, composition of food, indicators of sustainability, social changes, holistic approach, how to get consumer engagement?

Group CLIMATE (1), Garnett

Trend	Opportunity or challenge	R&I intervention	attribute
7, 8	Changing governance	1) Increasing our knowledge on	Sustainable,

	<p>structures and growth of cities and mega-cities</p> <p>&gt;challenge: globally agreed standards</p> <p>&gt;innovative responsive city regional level governance</p>	<p>corporate responsibility mechanisms and targets (stewardship) of the agro-food industry and the impact thereof on food systems in different parts of the world &gt;are there fundamental problems with corporate standards? What can we learn from specific standards to apply in other regions?</p> <p>2) What can the role of the cities and other self-governing communities be in the above?</p> <p>3) What is the role and limitation of certification standards (e.g. gluten-free) on food and sustainability and climate impact?</p>	<p>resilient, responsible</p>
2, 16	<p>Inequality links through multiple pathways with migration</p> <p>Challenge: food insecurity</p> <p>Challenge: disruption to agri-food production and supply chains</p> <p>Challenge: perpetuation of resource-intensive aspiration fueling unsustainability</p> <p>Opportunity: using food as an entry point for addressing broader inequalities</p> <p>Opportunity: migration could help adhere labor issue caused by ...</p>	<p>-methodologies for full ... (environmental and social ...)</p> <p>-methods for progressive ... of ...</p> <p>-research into policy options for addressing inequality in food systems</p>	
3, 6	<p>-Population growth increases resource pressure</p> <p>-youthful and ageing population create different ... problems and have different nutritional requirements</p> <p>Opportunity: older people may be more climate and health conscious while new education formats provide opportunities for learning about sustainability along whole life course</p>	<p>-opportunities to incorporate sustainability of food into school through to post grad.curricula</p> <p>-improve understanding of education translates into behavioral change &gt;going beyond seeing people as consumers with greater focus on values (this helps to guide to first point)</p> <p>-improve understanding of ageing population nutrition requirements (i.e. how they differ in types of food demanded) and net climate impacts</p>	

Key message pitch:

- Food production and consumption has influence on climate (by GHG) >need to make a change there
- What mix of policy mechanisms (regulatory, economic..) are effective, legal and feasible to foster a change?

- Different levels of governance necessary (city-level/ national level/ intergovernmental/ non-state actors like industry)
- What form of education and awareness raising is needed for regulatory actions
- Focus should turn from research on consumer to research on effective policy mechanisms

Group CLIMATE (2), Timmers

Trend	Opportunity or challenge	R&I intervention	attribute
16, 9, 11	<p>We have a huge complex challenge</p> <p>We have a huge mighty power: choices</p> <p>-Global shift of economy and ... governance</p> <p>-China rise impacting Africa and row impact on global consumption</p> <p>-need to raise awareness and understanding of new context</p> <p>-related education and awareness</p> <p>-new role of Europe as no longer ... of the world</p> <p>-role of states to protect and .. open access to keep data ...</p> <p>-cultural dimension...</p>	<p>-Impacts of Climate change on political and economic disruptions</p> <p>-food-climate policy</p> <p>-research on cultural social, political dimensions of choices and policies</p> <p>-modeling research on the resilience of food systems, consistency</p> <p>-the global shifts and trends/multiscale/multicriteria</p> <p>-organisation and public access of data</p> <p>-role games with ...makers and stakeholders</p> <p>-scenario building and de</p>	Sustainable, resilient, inclusive
10, 18	<p>Climate Change impacts food ... environm. degradation</p> <p>Food impacts Climate and environment</p> <p>-opportunity of rapid technological change and development on adaptation to Climate Change and understanding (modeling of change)</p> <p>-rapidly evolving context difficulty</p> <p>-technological adaptation and understanding of longterm impacts</p> <p>Open science and education is key</p> <p>-systemic change of climate change</p>	<p>-agile adaptation of agriculture/food production modelling/ research and data</p> <p>-deeper understanding of cascading/systemic effects of climate change and environmental degradation</p> <p>-better data on these disruptions and modeling /prediction</p> <p>-impact of consumption/food choices on GHG emissions (and waste, and transport)</p> <p>-integrated food systems assessment</p> <p>-link between research and policy making decisions, choices, transparency</p>	Resilient, inclusive, responsible

Key message pitch:

- Environment and climate change have impact on food security and vice versa: food production has impact on environment > need to understand systemic interactions
- Impact of consumption and food choices (e.g. transport of food)
- Research is needed on cultural, social and political dimensions of these choices

Group RESOURCE EFFICIENCY (1), Swanell

Nikola Schulz;Krijn Poppe

Trend	Opportunity or challenge	R&I intervention	attribute
10, 17, 18	<u>Re-engineering production for a resource-limited world:</u> >understanding and exploiting the microbiome >Broaden the horizon impact of genetics >from industrial system to one that builds on natural capital >how to underpin with data and ... >developing alternative sources of low impact proteins	1) understanding and working out how to better exploit the microbiome 2) broaden the horizon and impact of genetics – underpinned by a clear policy environment 3) understanding citizens perceptions of innovations in food and agriculture 4) make building natural capital part of standard agriculture practice 5) focus more strongly on proving applications work at scale – not just generating innovation	Sustainable, resilient, diverse, competitive, responsible
4, 10, 18	<u>Re-programming the supply chain:</u> >zero-waste >moving towards a circular model >automation >data exploitation and artificial intelligence >personalization of food >feeding the emerging middle class affordable, nutritional, safe food >building in resilience particularly for climate change	-driving a “zero-waste, circular economy” in food - turning huge data sets into effective knowledge for production and supply - policy instruments to ensure open access to data -research on what is an affordable nutritional food and what consumers want - in developing countries: help them benefit from “late ...advantage”	Sustainable, resilient, competitive, inclusive, responsible
1, 17, 10	<u>Changing what we eat:</u> >personalized nutrition >shift protein sources >move from calories to nutrition focus across the life stages >role of social norms – how to shift the diet	-research on nutritional requirements across age groups and gender and how to meet it across the world -understanding consumer behavior with regards to food and how to influence them; relate this to social norms -research on novel protein sources for humans and animals e.g. mussels vs fish	susta Sustainable, resilient, diverse, competitive, inclusive, responsible

Key message pitch: 3 key issues to tackle

- Re-engineer production (production in a resource-limited world, increase biodiversity, change the processing system)
- Re-programme supply chain (from big data sets to knowledge how to exploit the data)
- Change eating (from a culture of calories to a culture of nutrition)

Group RESOURCE EFFICIENCY (2), Schulz

Trend	Opportunity or challenge	R&I intervention	attribute
7	Opportunity: To concentrate human manure and use it for fertilization		

	<p>Challenge: Separation of agriculture/production and consumption</p> <p>Opportunity: pooling of resources, more circularity of resource use</p> <p>Challenge: economics of <b>scale</b> leading to <b>...</b> bigger production <b>...</b></p> <p>&gt;ethical issues &gt;Transparency</p>		
18	<p>Challenges:</p> <ul style="list-style-type: none"> <li>-resilience</li> <li>-how to produce food with less land</li> <li>-acidification of the oceans and impact on e.g <b>fisheries</b></li> <li>-food systems cannot adapt to quick changes</li> </ul> <p>&gt;<b>...</b></p> <ul style="list-style-type: none"> <li>&gt;price volatilities</li> <li>&gt;research has a price; difficulties to pool resources</li> </ul> <p>&gt;<b>...</b></p>		
18	Lack of flow of information	Shift from <b>... ..</b> on calls towards networking, ... management (model research) in order to better exploit research results (Model)	
7	Pooling of resources ( <b>...</b> )	Food regulations e.g. food safety regulations . need to be more horizontally and go across circular value chains(the new green deal)	
	Food security	<ul style="list-style-type: none"> <li>-What will food look like in 2030? (in cities, which lifestyles, what competences of the population)</li> <li>-migration and uncertainty and influence on population?</li> </ul>	
	Shift of production/consumption		

Key message pitch:

- Space for innovation and real experimentation needed for the food sector
- Resource efficiency is crucial for food security
- To make food production efficient on the long-run, important to not only look at specific aspects or departments of value chain (e.g. in food safety regulations)
- To achieve resource efficiency >need to tackle value chain as circular system in a collective approach



Group EMPOWERMENT OF COMMUNITIES (1), Constanza

Trend	Opportunity or challenge	R&I intervention	attribute
13 (media new)	Other businesses come into food sector (mainly distribution) and threaten “food culture” >can increase disengagement with food purchasing and alter habits >fuels narrative that buying food is a hurdle that needs to be made as easy and efficient as possible >push for “easy” products to be sold (frozen, convenience, etc. to endure modern ...)	-research on information development; education to boost awareness of citizens on choices as consumers and their impacts (environment – nutrition-...) -explore new ways to make the science and facts about food a more regular issue on media .. (reboot food litera at several levels (community, research, policy,..) for maximum and effective outreach on a regular basis > changing cultures and paradigms is long-term!)	Resilient, inclusive
8 (local, inclusive forms of governance)	-new forms of dialogue and trust among actors -knowledge exchange -resource efficiency or more sustainable practices/circular way of producing to consuming to waste to re-use	-develop data and information infrastructure to enable optimal decision making at local level (i.e. capture local trends, interactions - social, economic, environmental) -develop research to evolve local political processes based on a food system approach (e.g. transdisciplinary learning, ...)	Sustainable, diverse, resilient, inclusive, responsible
7 (urbanization)	-city people risk not knowing how food is produced and delivered /inter-generational risk -“killing” food culture, also physically if enough spaces for communal sharing/ comunalidad exist -also locks-in people to city and hinders opportunities/knowledge/interest to go rural and grow food (or support it) -connection to nature/rhythms/seasons lost and ...		

Key message pitch:

- Food is about people; R&I should boost food culture and capture multi-dimensional aspect as well as connect all people
- “make our food great again”

Group EMPOWERMENT OF COMMUNITIES (2), Bozic

Trend	Opportunity or challenge	R&I intervention	attribute
10, 4, 13	Taking advantage of technologies (e.g. digital, communication, robotics) to empower communities, e.g. -strengthen regional food systems -increasing stakeholder participation in food system and circularity	-bringing together different disciplines -How to facilitate integration of technologies from other industries to food systems	Competitive, inclusive
14, 15	-Enabling healthy diets for all -cross-fertilisation originating from other industries (into the food system) How to increase the process	-understanding links between food and health and education -technological solutions to improve nutritional security, necessary social empowerment underpinned by education -understanding trade-offs between food safety and quality	Resilient, inclusive
5, 6	-Create jobs supported by resilient education systems -Mismatch between education system and customer/society needs	-investigate drivers of educational systems (access to education system, not finding the jobs) ... -linking social, technological and educational -engage and commitment of all stakeholders	Divers, competitive, inclusive

Key message pitch:

- Strengthen multi-disciplinarity: bring in/integrate technologies from other sectors into food area and use advantages
- Enable “healthy diets for all” by using the link/interactions between food-health-education
- Social empowerment and education > educational systems should be driven by how to make a change (create and implement changes) and how to engage people and all stakeholders