

# **Global and sustainable Food and Farming Futures: *Challenges and Choices***

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**What are the main global challenges  
and choices in food and farming for  
the next decades ?**

# Increase of worldwide demands for food, feed, fibre and fuels

## REASONS:

- Continuously growing world population, but slowing down in the next 30 years; growing use of oil for energy, mobility, transport and other purposes
  - Growing or continuous wealth in US, Canada, Europe and BRICKS countries:  
overproportional increase of meat consumption, dairy products, eggs, fats, energy and water intensive food, for example vegetables, horticultural products, fruits, fish, luxury goods and services, with a strong emphasis on health
  - Growing demand for micronutrients (hidden hunger and health issues)
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# Decrease of available arable land worldwide

- Only one third of cultivated land available per capita compared with 1950 !
  - This trend is going to continue, even worsened by continuous soil erosion, desertification and **urbanization** activities all over the world, including doubtful soil and water management.
  - Urbanization in particular will lead to a strong increase of processed food with large impacts on retailing and distribution systems, more energy consumption and heavier losses
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# The challenge: How to bridge the gap between offer and demand ?

- Sustainable increase of yield per hectare (increase in crop and livestock productivity)
  - Successfully combating plants and **animal diseases**, also in a preemptive way
  - Measures of **resources efficiency** along the whole **food-feed-chains**
  - Use of hitherto not usable or accessible arid or semi-arid land by plants and **animals** (deforestation no solution !)
  - Increased use of any kind of existing or dedicated waste based on biological resources (incl. **animal's waste**)
  - Increased use of existing ligno-cellulosic biomass
  - Increased use of microalgae and other ocean seas-potentials
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# The challenge: How to bridge the gap between offer and demand ?

- Increased storage capacities for water, food, feed and fodder
  - Decrease of pre- and post-harvest losses in agriculture (estimates of 60% in Russia, 35% in India etc.)
  - Decrease of other losses along the whole food chain (appr. 20% in Europe). Losses in the feed chain have not yet been seriously examined !
  - **THUS A BOUQUET OF MEASURES WILL BE NECESSARY TO BRIDGE THE GAP !**
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## **Conclusion:**

**We need not only a Sustainable Crop Production Intensification (SCPI),  
but also a SLPI (Sustainable Livestock Production Intensification) !**

**We also need success stories – understandable, best practices, pilot and demonstration activities !  
These might differ from regions with different climate seasons, environmental and economic environments as well as cultures and traditions.**

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# Conclusions

**But where are the limits ?**

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**There are inherent contradictions  
and/or conflicts to be understood  
and to be overcome**

# Conflicts

- Growth – higher yield of plants and livestock vs. Climate friendliness and biodiversity
- Food vs. Fuel
- Meat-based food vs. Non-meat-based food
- Climate vs. Food - Health - Well-Being
- Human health vs. Environment
- Animal welfare and animal health vs. Feeding the world vs. Consumers acceptance and sustainability
- Small landholders vs. intensive land use systems

These conflicts will only be overcome by new knowledge created by research on plants and animals, and the environment

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## Conflicts

**Solving these conflicts we face an increasing level of complexities. These require a new understanding on extension services, on better education and training and better economic, societal and political marketing, involving farmers and forest owners, more than ever.**

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# **Drivers of change in the food chain : from fork to farm**

**Sufficiency,  
Ownership**

**Ethics**

**Urbanisation**

**Health**

**Convenience**

**Pleasure**

**Well Being**

**Sustainability**

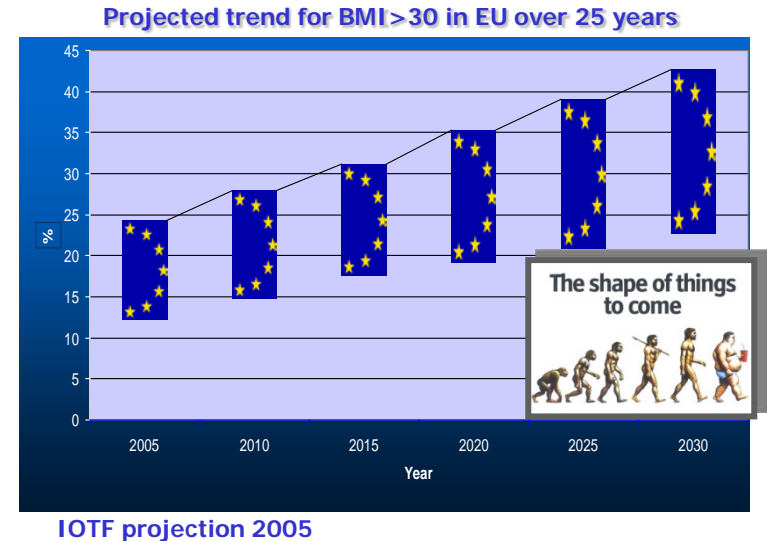
**Climate and  
environmental protection**

# Challenge for the future Action to protect health

Increasing world  
Population  
(and Migration)

Ageing population  
(cognitive decline)

Diet-related  
diseases (metabolic  
disorders, allergies,  
obesity)



Interactive,  
personalised  
food

From curative to preventive health care

Healthier lifestyle, fresher, healthier and  
safe foods, lower on fats etc.,  
incorporating new ingredients, bioactive  
components, with enhanced availability

# Challenges for Future Food and Climate Issues

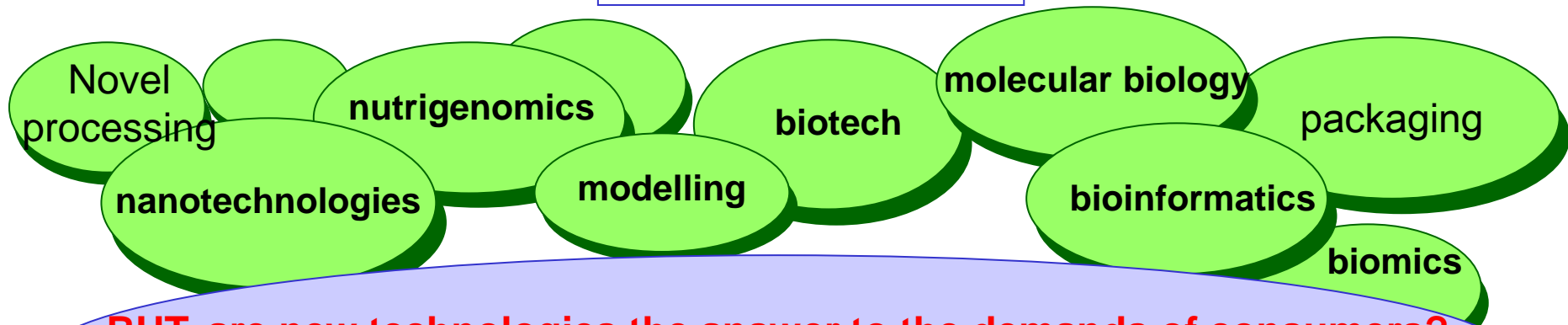
- Sustainability within the total food production chain, but also the feed chain ! (“from guts to table“)
  - Livestock as an important climate change factor, contributing to but also suffering from climate changes (GHG emissions, CH<sub>4</sub> issues, increasing water and land consumption)
  - Introducing „Climate-friendly menus“: drinking barley-based beer and eating soya (not-animal) based food !  
For these cases animal based products are important candidates
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# Challenges for Future Food and Climate Issues

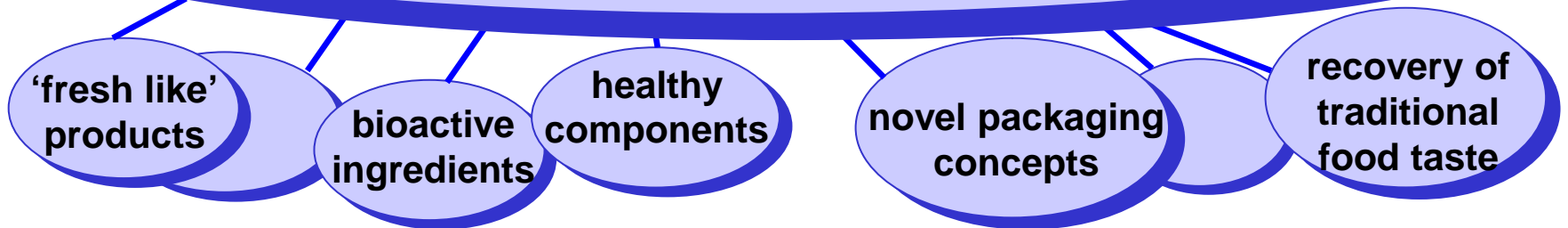
- Defining and measuring of the carbon footprint, accountability, labelling, particular with respect to livestock production
  - New emphasis on innovation ?
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# Effective tools for implementation

## TECHNOLOGY



**BUT, are new technologies the answer to the demands of consumers?  
What is the best strategy of the food industry when using technology?**



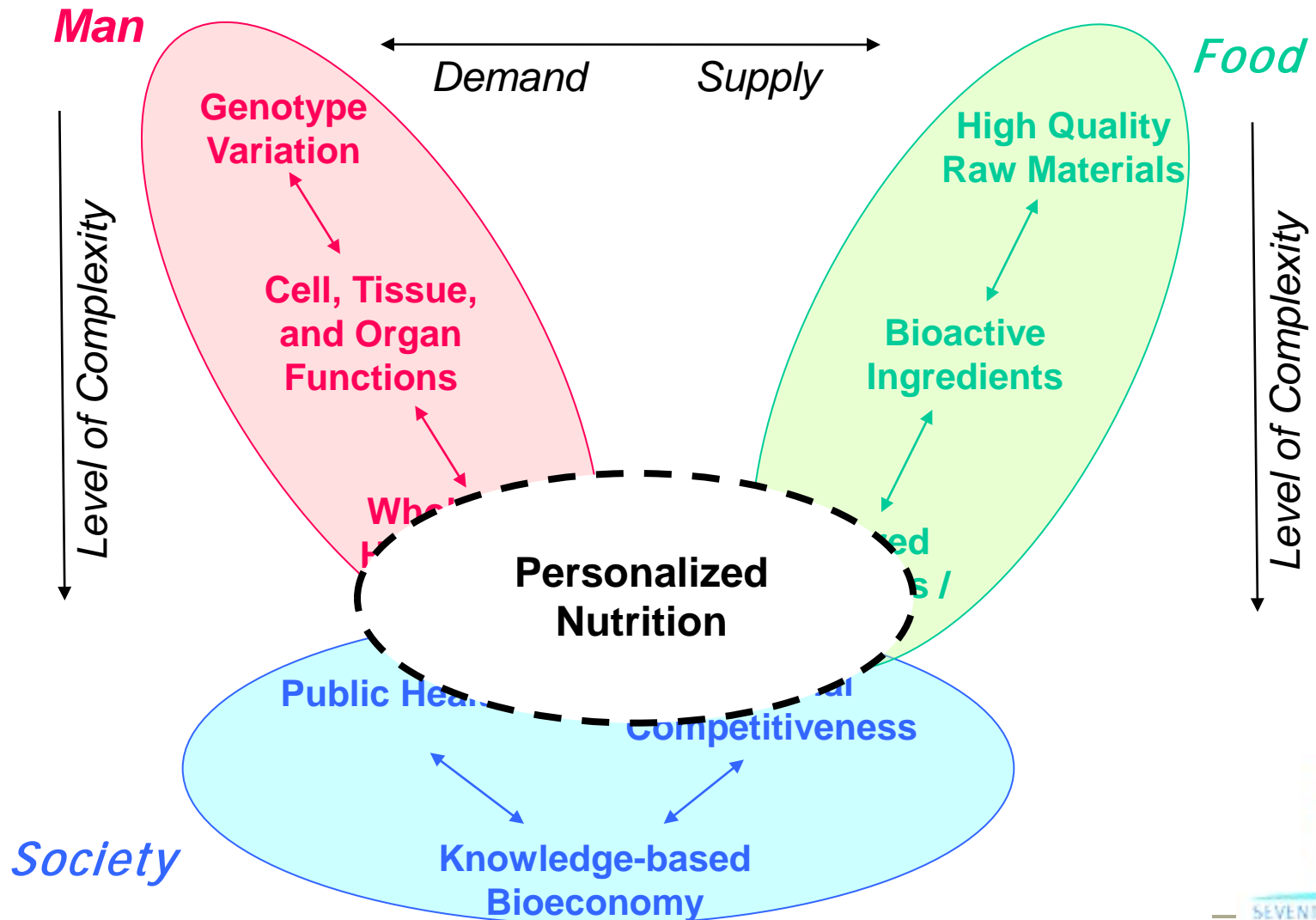
## STRATEGY



# 'Personalized Nutrition' -

## A Lead Vision for Food and Nutrition Research

Applying individual genetic profiling and systems biology knowledge in order to provide tailored food products and/or dietary recommendations as a contribution for personalized health care and disease prevention



# Europe 2020 Strategy

→ Vision of Europe's social market economy for the 21st century

→ Puts forward 3 mutually reinforcing priorities:

- Smart growth: developing an economy based on knowledge and innovation
  - Sustainable growth; promoting a more resource efficient, greener and more competitive economy
  - Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion
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# Recent developments in Europe

- Renaissance of Innovation in the EU as a Driver for the Future:  
  
„Building the Bioeconomy until 2020“ as one of the 7 European Innovation Partnerships (EIP) within the new Innovation Union in the „Europe 2020 Strategy“ replacing the Lisbon Strategy: more precisely, „Sustainability and Productivity in Agriculture“
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# What is the Knowledge-Based Bio-Economy?

**The knowledge base:** Advances in Life Sciences and Biotechnologies in convergence with other technologies such as nanotechnologies, chemistry, information technologies..,

**The Bio-Economy:** Includes all industries and economic sectors that produce, manage or otherwise make use of biological resources including bio-waste.

The European Bio-Economy has an approximate **market size** of over 2.0 trillion €, employing more than 22 million people.

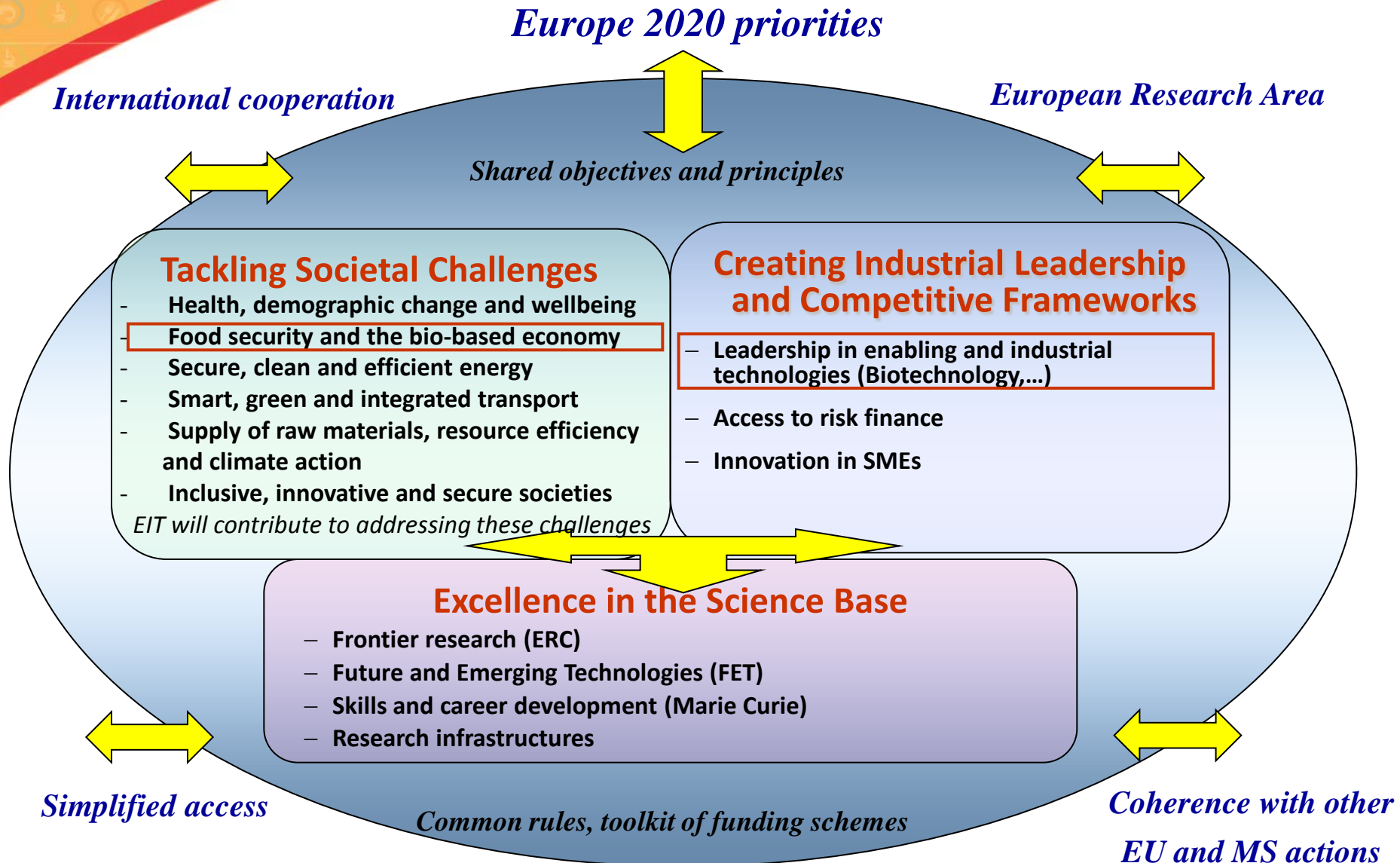
**→ 4 Fs: Food, Fees, Fiber and Fuel**



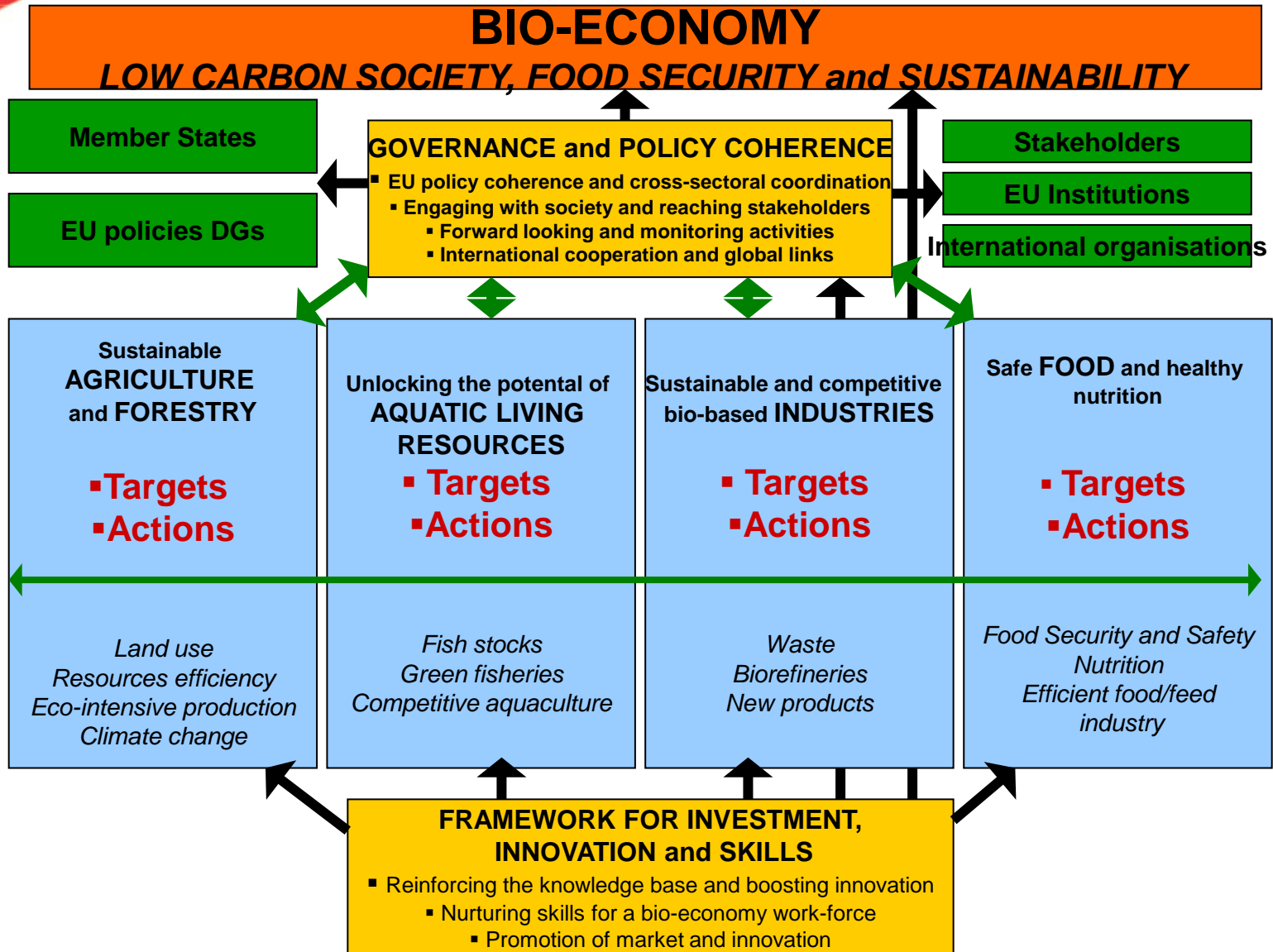
# Proposal for Multiannual Financial Framework

- ▶ **Adoption on 29 June 2011** Com(2011) 500
- ▶ **Time frame 2014 – 2020**
- ▶ **Overall amount for Horizon 2020: €80,2 billion** in constant 2011 prices (€90 billion in current prices)
- ▶ **Bio-Economy and agri-food research and marine (including aquaculture) the only area with an already allocated amount of €4.4 billion (2.3 times the FP7 budget for KBBE)**
- ▶ **Total amount for Horizon 2020 represents a 46% increase over the FP7 budget**

# Common Strategic Framework for Research and Innovation



# Bio-Economy Commission Communication





# Bio-Economy Commission Communication Draft Targets and Actions

## Sustainable agriculture and forestry

### ► Targets

- Increase the resource efficiency of agriculture
- Increase the efficiency of input use
- Reverse the deterioration of the functionality, water retention, productive capacity, biodiversity and nutrient buffering capacity of soils
- Reduce agriculture GHG emissions and enhance carbon sequestration

### ► Actions

- Increase R&I focused on productivity
- Enhance knowledge exchange
- Develop and validate models
- Exploit better the outputs of biological research in genomics and related “omics“
- Robust biomass carbon balance and sustainability criteria
- Advance forestry research





# Bio-Economy Commission Communication Draft Targets and Actions

## Unlocking the potential of aquatic living resources

### ► Targets

- **Exploit fish stocks at sustainable levels**
- **Promote sustainable and competitive aquaculture**

### ► Actions

- **Reliability and quality of scientific advice for fishery management**
- **Make the fisheries sector more sustainable**
- **Offer full transparency to authorities and consumers on the origin of new materials**
- **Promote development of EU aquaculture**
- **Foster innovation and competitiveness in aquaculture production systems**



# Bio-Economy Commission Communication Draft Targets and Actions

## Safe food and healthy nutrition

### ► Targets

- Sufficient, safe, nutritious and affordable food
- Decrease the burden of diet related diseases
- Significantly reduce water and energy consumption in food processing, transport and distribution
- Reduce avoidable food waste by 30% in Europe in 2020

### ► Actions

- Develop new process technologies to enhance the functionality, quality and nutritional value of food
- Factors affecting food choice
- Develop indicators for a broad range of food production systems
- Coordinate existing policy and explore new policy to reduce food wastage
- Invest in further trans-disciplinary research in the food sector

**Thank you very much  
for your attention**

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