Why we need today to design sustainable agricultural and food production systems in the Mediterranean area?

What are the main methodological challenges?

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1st Mediterranean Forum
Designing Sustainable Agriculture and Food Production Systems under Global Changes in the Mediterranean
18–19 July 2016, Montpellier
Outline

- Sustainability is a condition for FSN
- The global food system is not sustainable. Sustainability challenges are particularly acute in the Mediterranean
- Some methodological challenges
Sustainable food systems/UN agenda

- Zero Hunger challenge launched by the SG in Rio+20
- Sustainable food systems at FAO conference 2013,
- Theme of World Food Day 2013
- Food losses and waste in a context of sustainable food systems, in CFS 2014, HLPE report
- ICN2
- SDGs
- FAO/UNEP program on sustainable food systems integrated in the 10 YFP on SCP
Zero Hunger Challenge

- 100% access to adequate food all year round
- Zero stunted children less than 2 years
- All food systems are sustainable
- 100% increase in smallholder productivity and income
- Zero loss or waste of food

Hunger can be eliminated in our lifetimes.
A *Sustainable Food System* (SFS) is a food system that ensures food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition of future generations are not compromised. (HLPE 2014)
Triple burden of malnutrition

Majority of the poor and hungry are food producers

Growing demand, in quantity, quality and diversity

Food production & consumption already exerts considerable pressure on environment

Resources fragile & scarce

Climate change

Food systems are increasingly dependent of international trade
Malnutrition

- 795 million people are undernourished
- Over 2 billion people world wide suffer from micronutrient mal nutrition
- In 2014, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 600 million were obese
- Increases in unhealthy patterns are outpacing increases in healthy patterns in most world regions (Imamura et al, 2015)
Nutrition transition

- Undernutrition still significant in the South
- Rate of stunting still significant in many southern and Eastern countries of the Mediterranean
- Increase of overweight and obesity, to alarming rates
Population Mediterranean

- Total
- Urban


Axes:
- Y-axis: 0, 100 000 000, 200 000 000, 300 000 000, 400 000 000, 500 000 000, 600 000 000
- X-axis: Titre de l'axe

Food and Agriculture Organization of the United Nations
Access

- 38% of the global workforce depends on agriculture

- In Southern and Eastern Mediterranean countries, 25% to 45% of the population get the majority of their revenues from agriculture.
Per capita GDP and meat consumption by country

Figure 1.4 The relationship between meat consumption and per capita income in 2002

Note: National per capita based on purchasing power parity (PPP).
Comparaison of different diets impacts on health and environmental sustainability (Van Dooren, et al., 2014)

- Matrix with a comparison of the health and sustainability scores of different diets (Health score of 100 complies with WHO and Dutch guidelines; a sustainability score of 100 complies with a 20% reduction in GHG and a 44% reduction in LU).
- To explore both scores of the current Dutch diet, we analysed diets with a health focus (I) and animal protein reduction (II), as well as combinations of the two.
- The arrows illustrate the different options to improve the scores. (I) Health focus, (II) animal protein reduction, (III) dietary guidelines diet towards animal protein reduction, (IV) vegetarian diet towards health focus, (V) easiest choice for simultaneously higher health and sustainability score (semi- and pesco-vegetarian).
Global Food Losses

- Cereals
- Roots & Tubers
- Oilseeds & Pulses
- Fruits & Vegetables
- Meat
- Fish & Seafood
- Dairy Products

FAO, 2011
## Land distribution and access

<table>
<thead>
<tr>
<th>Regions</th>
<th>Cultivated land (million ha)</th>
<th>Population (million)</th>
<th>Cultivated land per capita (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-income countries</td>
<td>441</td>
<td>2 651</td>
<td>0.17</td>
</tr>
<tr>
<td>Middle-income countries</td>
<td>735</td>
<td>3 223</td>
<td>0.23</td>
</tr>
<tr>
<td>High-income countries</td>
<td>380</td>
<td>1 031</td>
<td>0.37</td>
</tr>
<tr>
<td>Total</td>
<td>1 556</td>
<td>6 905</td>
<td>0.23</td>
</tr>
</tbody>
</table>
Land degradation

Biophysical Status of land

Levels of water scarcity
Different Puglia's local varieties of carosello and barattiere (Cucumis melo L.). (Renna et al., 2014)
Systems at risk

- Floods/sea-level rise
- Water scarcity
- Pollution
- Loss of biodiversity
- Deforestation
- Desertification/droughts
- Loss/low soil fertility
- Erosion
- Land scarcity
- Cropland

Food and Agriculture Organization of the United Nations
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The State of Mediterranean and Black Sea Fisheries

http://www.fao.org/3/a-i5496e.pdf

85% of fish stocks assessed are fished at biologically Unsustainable levels
Productivity trends by 2050

Source: IPCC (2007)
A: irrigated maize and irrigated seasonal vegetables - B: irrigated fruits and vegetables - C: fodder crops and vegetables - D: rainfed cereals and legumes - E: rainfed wheat and barley - F: Other rainfed crops.
Cascading Impacts
Globalization and economic interdependencies

Total agricultural trade

Exports_1000USD

Year

Source: Faostat Database of the United Nations
Food price increases and high price volatility

FAO Monthly Food Price Indices, 2002 – 2004 = 100

Source: FAO, 2011
Past and projected evolution of cereals net trade

Source: AT2050

- developed countries
- Sub-Saharan Africa
- Near East North Africa
- Latin America and Caribb
- South Asia
- East Asia
- Others

million tons

Challenges

- Triple burden of malnutrition
- Majority of the poor and hungry are food producers
- Growing demand, in quantity, quality and diversity
- Food production & consumption already exerts considerable pressure on environment
- Resources fragile & scarce
- Climate change
- Food systems are increasingly dependent of international trade
Methodological challenges

- From global theoretic to concrete, operational
- Avoid risk of paralysis
- Pluri/transidisciplinary
- Determine priorities
- Provide clear and complete information
Transform food systems?

- Production systems
- Lifestyles
- City planning
- Food culture
- Drivers of change?
From concepts to actual diets

Traditional food systems in the Mediterranean

Traditional diets in the Mediterranean

Mediterranean diet MODEL

Actual diets in the Mediterranean

Food System(s) in the Mediterranean

SUSTAINABLE DIETS

SUSTAINABLE FOOD SYSTEMS
Governance of what?

- natural resources
  shared resource (water, fish, pasture)
  shared space (forest, protected area)

- food chain

- voluntary standard

- territory
Governance: how?

- places, institutions
- inclusiveness
- commun understanding of the issues
- shared values?
- shared knowledge (assessment, monitoring)
Opportunities

- The Mediterranean as a case study
- Tradition of dealing with/ managing resource scarcity
- Strong tradition of « integrated approaches » (geography)
- Human capital
- Identity

- Mediterranean as a model. Ex water management, diet...