“duALIne”
An INRA-CIRAD prospective study on Food System and Sustainability

Aims and First Issues

L.G. Soler
INRA-Paris
General Context

The issue of sustainable food systems raises several challenges:

- the supply of food to the global population,

-a reduction in diseases caused by over-nutrition and malnutrition,

- a reduction in food and health inequalities in both developed and developing countries,

- a reduction in the ecological impact of food production systems
“Agrimonde” foresight study, undertaken jointly by INRA and CIRAD (2009), showed that these ambitions are not impossible, if certain conditions are met such that:

- A sustainable increase in yields on the supply side,
- A reduction in losses and waste between the farm gate and the consumer's fork,
- A modification of the content of different diets that are currently consumed
- ....

However, food system is very complex (quantitative and health aspects of nutritional needs; but also cultural, consumerist, social, economic and local roots. ..)

**individual choices** that determine food intake // broad variety of **socioeconomic actors** involved
The need to implement new research programs

• General purpose of “duALIne” prospective study is to determine priorities for research in order to address these complex issues

• This project has been initiated jointly by INRA (French National Institute for Agricultural Research) and CIRAD (Agricultural Research for Development)

• Around 50 experts are involved, coming from various academic fields, but also representatives from food industry, retailing, ministries…

• January 2010-June 2011
In this general framework, we try to identify research programs needed for:

- **assessing the food system sustainability** (economic, environmental, social and health impacts): methods and data

- **understanding determinants of non sustainability**: economic forces, social dimensions, technological constraints...

- **assessing the solutions** to improve the food system sustainability (public policies; innovations...)

Method

• Consider each step from the consumers to the farm gate: consumption-distribution/retail-processing-supply

• Identify research needs in various disciplines (food sciences, nutrition, environmental sciences, agronomy, supply chain management, economics and social sciences…)

• Identify the needs of integrated approaches:
  - Interfaces between disciplines (ex: food technology-social sciences…)
  - Data, Models and Tools for supporting integrated analyses
Some critical issues:

1. Price volatility of agricultural products
   - Robustness/flexibility of the food chains
   - Industrial technology: process design, processed food formulation…
   - Supply chain organization and price transmission from upstream to downstream markets
   - Spot markets/Contractual relationships
   - Producers’ income stabilization
2. « Standardization » of the raw material and « delayed differentiation »

- Changing the historical trend? Creating food variety through diversification of the agricultural products and/or processing?

  - Innovations and firms’ efficiency

  - Criteria for product differentiation

  - Consumers’ perception and acceptance: « natural » vs « technological foods »

  - Economic effects (value sharing, prices and variety of the final products...)
3. Location of production/processing/distribution units

In light of the major dynamics of urbanisation and rural space occupation, what are the potential consequences in terms of food supplies?

- Will new modes of urban organisation exert an impact on food distribution?
- What will be the optimum location for production in the light of changes to consumption, regional management, the consumption of local resources and the impact of distribution logistics?
These challenges require the exploration of, amongst other factors:

- Knowledge in terms of models for spatial economics and economic geography

- Methodologies to evaluate different food systems at a local scale, their tools and their results

- Methods to compare the Performance of Local and Mainstream Food Supply Chains: economic, environmental, food quality impacts

- Interactions between location and technological choices (more or less polluting)
4. Sustainability reinforcement, which results in

- **Market mechanisms**: from the initiative of producers/processors/retailers or at consumers’ request

- **Public action**: National or international public bodies may impose minimal norms.
• Voluntary / mandatory changes

Incentives for voluntary changes by firms: Porter’s assumption?

• Supply / demand public policies

How do they interact?
Labelling, tax policies… have impacts on both sides
Optimal policy mix?
5. Consumers’ behaviours

Pace of changes?

It takes time... but behaviours may change

How to manage short term (through labelling for instance) / long term evolutions (change of social norms)?
Scientific articles on the effect of cholesterol on health
## Effects of the nutritional information on the demand 1978-1991

<table>
<thead>
<tr>
<th>Products</th>
<th>Expenditure elasticity</th>
<th>Price elasticity</th>
<th>Information elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>1.19</td>
<td>-0.78</td>
<td>-0.30</td>
</tr>
<tr>
<td>Pork</td>
<td>1.01</td>
<td>-0.72</td>
<td>-0.16</td>
</tr>
<tr>
<td>Other meats</td>
<td>1.79</td>
<td>-0.54</td>
<td>-0.35</td>
</tr>
<tr>
<td>Charcuterie</td>
<td>1.07</td>
<td>-0.92</td>
<td>0.13</td>
</tr>
<tr>
<td>Poultry</td>
<td>1.22</td>
<td>-0.93</td>
<td>-0.02 <em>ns</em></td>
</tr>
<tr>
<td>Eggs</td>
<td>1.12</td>
<td>-0.21</td>
<td>-0.33</td>
</tr>
<tr>
<td>Fish</td>
<td>1.42</td>
<td>-0.71</td>
<td>-0.08 <em>ns</em></td>
</tr>
<tr>
<td>Milk</td>
<td>0.71</td>
<td>-0.62</td>
<td>0.10</td>
</tr>
<tr>
<td>Cheese</td>
<td>1.06</td>
<td>-0.65</td>
<td>-0.03 <em>ns</em></td>
</tr>
<tr>
<td>Yogurts</td>
<td>0.85</td>
<td>-0.85</td>
<td>0.72</td>
</tr>
<tr>
<td>Butter</td>
<td>0.55</td>
<td>-0.29</td>
<td>-0.22</td>
</tr>
<tr>
<td>Oil</td>
<td>0.63</td>
<td>-0.90</td>
<td>0.28</td>
</tr>
<tr>
<td>Vegetables</td>
<td>1.25</td>
<td>-1.02</td>
<td>-0.11</td>
</tr>
<tr>
<td>Fruits</td>
<td>1.07</td>
<td>-0.80</td>
<td>0.03 <em>ns</em></td>
</tr>
<tr>
<td>Cereals</td>
<td>0.56</td>
<td>-1.18</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Source: V. Nichele, Health Information and Food Demand in France, 2003
Fig. 1 Time trend of the Recommendation Compliance Index (RCI) for a selection of countries over the period 1961–2002

Source: Mazzocchi et al., *Pub Health Nut*, 2008
Thank you for your attention...

...and your patience:
the final report will be published in next June!