SYSTEMIC DESIGN IN AGRO-FOOD SECTOR: EN.FA.SI. PROJECT
1- DEFINITION
2- METHOD
3- EN.FA.SI PROJECT
4- RESULTS
5- CONCLUSIONS
1- DEFINITION

WHAT DESIGN FOR FOOD MEANS?
THE FOUR SPHERES
WHAT DOES DESIGNING FOR FOOD MEAN?

RESPONSABILITY
IN HUMAN AND ENVIRONMENTAL HEALTH
THE FOUR SPHERES OF DESIGNING FOR FOOD

ENVIRONMENT

ECONOMY

SOCIETY

TECHNOLOGY
THE FOUR SPHERES OF DESIGNING FOR FOOD

**ENVIRONMENT**
- perpetuation of local culture
- protection of native species
- land conservation and protection of soil
- application of scientific innovation in the field
- enhancement of the know-how mainly held by the elderly
- increasing local workplaces
- clean industrial processes
- efficient logistics
- increasing productive activities in the area
- integration of different production activities
- niche businesses development

**ECONOMY**
- process innovation
- efficiency
- niche businesses development
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**THE FOUR SPHERES OF DESIGNING FOR FOOD**

1. **DEFINITION**

- enhancement of the know-how mainly held by the elderly
- application of scientific innovation in the field
1- DEFINITION

THE FOUR SPHERES OF DESIGNING FOR FOOD

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- process innovation

**ECONOMY**
- increases efficiency

**SOCIETY**
- links among the four different spheres
- application of scientific innovation in the field
- niche businesses development
- process innovation
- efficiency

**TECHNOLOGY**
- increases efficiency
- niche businesses development
- process innovation

**THE FOUR SPHERES OF DESIGNING FOR FOOD**
- environment
- economy
- society
- technology

Silvia BARBERO, Paolo TAMBORRINI

INTERNATIONAL CONF. ON DESIGNING FOOD AND DESIGNING FOR FOOD
LONDON METROPOLITAN UNIVERSITY, JUNE 28-29, 2012
2- METHOD

SYSTEMIC DESIGN APPROACH
SYSTEMIC DESIGN PRINCIPLES
WHAT IS SYSTEMIC DESIGN?

Systemic Design cares about the relationships among people, activities and territorial resources, enhancing culture and identity, and producing growth and well-being for individuals and communities.
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  - Intervening in a novel manner on processes and how they relate creates what is known as a blue economy.
  - Growth occurs through self-poiesis and the end products is sustainable development.
  - Local resources become input.
  - Output becomes local requirements.
  - External resources become input.
  - New economical model based on open industrial cycles.
  - Awareness of one's values (expressed through behaviour) creates identity.

**WHAT IS SYSTEMIC DESIGN?**

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The Systemic Design Methodology is based on different principles:

- An holistic survey shows the current state of the art.

Defining the boundaries of the system is possible to outline all its components, all the relative data about incoming/outcoming flows of materials and energy, and also information about their origin, transformations and destination.

This represents both quantitative and qualitative analysis of the system.
The Systemic Design Methodology is based on different principles:

- The global vision of the system is organized by single components. To avoid the entropy of the system, its components are not analysed only within the system, but also the external links are taken into account. The complexity comes out from the contextualization of the system in its environment.
The Systemic Design Methodology is based on different principles:

- The principles coming out from the other sciences (like Physics, Biology, Chemistry, Mathematics, History and Economy) are indispensable tools for the study of the system in analysis.
The Systemic Design Methodology is based on different principles:

- A designer is able to understand **causality relationships** among several phenomena and to discern the priorities of the process, defining an improved model of efficiency. The designer coordinates, enhances and harmonizes multidisciplinary contributions, changing the dynamics of a production.

The designer represents an **intermediary** for the production and consumption systems.
3- EN.FA.SI. PROJECT

FOOD SCENARIO
THE TERRITORY
THE ACTUAL PRODUCTION OF BEANS
LOCAL NETWORK
THE DESCRIPTION OF THE PROJECT
SWOT ANALYSIS
FOOD SCENARIO

FOOD CONSUMPTION MODEL
during the last two decades

- growing demand for food
- availability of pesticides and fertilizers
- lowering costs for logistical factors
FOOD SCENARIO

FOOD CONSUMPTION MODEL
during the last two decades

growing
demand for food

available
availability
of pesticides and fertilizers

lowering costs
for logistical factors

AGRICULTURE TODAY

impoverishment of the soil

mutation of traditional cultivation

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FOOD SCENARIO

FOOD CONSUMPTION MODEL
during the last two decades

- growing demand for food
- availability of pesticides and fertilizers
- lowering costs for logistical factors

AGRICULTURE TODAY

- impoverishment of the soil
- mutation of traditional cultivation
- crisis as an opportunity to innovate
Cuneo’s bean supply chain is of great importance for the cultural history of the province.

The production is based on a “Consortium”, set up by the Chamber of Commercio of Cuneo in 1989, to promote TFP (Traditional Food Products) and PGI (Protection of Geographical Indication) certification of Billò bean.
CUNEO BILLÒ BEAN<sup>PGI</sup> PRODUCTION TODAY

- **FLOOD IRRIGATION**: 3,000,000 l/ha
- **MECHANICAL PROCESSES**: 2.5 l/ha
- **FERTILIZATION**
  - Tricoderma copper products
- **MARKET**: ~40 km

**CUNEO BILLÒ BEAN<sup>PGI</sup>**

- **1 ha**
- **2 q/ha**
- **BURNED IN THE FIELD**
- **MARKET**
CUNEO BILLÒ BEAN\textsuperscript{PGI} PRODUCTION TODAY

- Flood irrigation: 3,000,000 l/ha
- Tricoderma copper product
- Fertilization:
  - Tricoderma copper product
  - Fossil fuel
- Mechanical processes:
  - Oil: 2.5 l/ha
  - Tight rotation in specialized companies

- Biomass sticks: 2 q/ha
- Burned in the field
- Water consumption: too much
- Air pollution: no values for waste
- Waste: no diffusion

- Market: too much chemicals
- Low knowledge in fertilization
- Low efficiency in distribution
LOCAL NETWORK: THE ACTORS

CUNEO BILLÒ BEAN PGi

20 km
10 km
10 km

CReS
TECHNOLOGICAL KNOW-HOW

PRODUCTION

PACKAGING

SELECTION

AGRINDUSTRIA
COOKING

2 q/ha

~10 km

MARKET

precooked product ready in 10 minutes

1 ha

LOCAL NETWORK: THE ACTORS

CUNEO BILLÒ BEAN PGi

2 q/ha

~10 km

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2 q/ha

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MARKET

precooked product ready in 10 minutes

1 ha
3- EN.FA.SI. PROJECT

CUNEO BILLÒ BEAN\textsuperscript{PGI} PRODUCTION BY EN.FA.SI. PROJECT

- FERTILIZATION: seed dressing, antagonistic fungi, insects auxiliary
- DRIP IRRIGATION: 3,000 l/ha
- FUEL: oil 2.5 l/ha
- DRYING: ~10 km
- AUToclave COOKING: 2 q/ha
- GASIFICATION: composting
- MARKET: precooked product ready in 10 minutes
- VACUUM PACKAGING: warm
- SELECTION: 1 ha
- PRECOOKED PRODUCT: 3,000 l/ha
- ENERGY: biomass
- WATER: waste

Silvia BARBERO, Paolo TAMBORRINI
CUNEO BILLÒ BEAN<sup>PGI</sup> PRODUCTION BY EN.FA.SI. PROJECT

Drill irrigation (3,000 l/ha)

Fertilization with seed dressing, antagonistic fungi, and insects auxiliary.

No chemicals.

Fuel: 2.5 l/ha

Selection:
- 1 ha
- 2 q/ha

Auto clave cooking:
- Warm energy
- Water

Drying:
- Long-term storage
- Fast cooking by end-users
- Recovered water

Vacuum packaging:
- Precooked product ready in 10 minutes

Market:
- Recycled water

Composting:
- Organic waste recovered

Biomass:
- Sticks

CUNEO BILLÒ BEAN<sup>PGI</sup> production by EN.FA.SI. PROJECT

Silvia BARBERO, Paolo TAMBORRINI

International Conf. on Designing Food and Designing for Food
London Metropolitan University, June 28-29, 2012
### S.W.O.T. Analysis of EN.FA.SI. Project

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>Good climatic condition</td>
<td>Low availability of registered plant protection and weed killer</td>
</tr>
<tr>
<td>Perfect land characteristic</td>
<td>General lack of stable material</td>
</tr>
<tr>
<td>Experience of agricultural entrepreneurs</td>
<td>Low knowledge in fertilization</td>
</tr>
<tr>
<td>Typical production</td>
<td>Mechanization in delivery products for plant protection</td>
</tr>
<tr>
<td>Unique product with low competition</td>
<td>Watering</td>
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<tr>
<td>Mechanization of seeding and harvesting phases</td>
<td>Land problems with plant protection</td>
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<tr>
<td>Many typical varieties</td>
<td>Tight rotations in specialized companies</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
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<tbody>
<tr>
<td>New markets</td>
<td>New problems related to plant protection</td>
</tr>
<tr>
<td>Industrial transformations to obtain new products</td>
<td>Decreasing of rotations and stubbles</td>
</tr>
<tr>
<td>Valorization of the product (PGI)</td>
<td>Increasing of new products without the right organization</td>
</tr>
<tr>
<td>The production is concentrated in a specific area</td>
<td>Availability of external labour</td>
</tr>
<tr>
<td>Recovering and increasing local species</td>
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</table>
4- RESULTS

ENVIRONMENT
ECONOMY
TECHNOLOGY
SOCIETY
SYSTEMIC DESIGN IN AGROFOOD SECTOR: EN.FA.SI. PROJECT

4- RESULTS

ENVIRONMENT

- protection of native species
- land conservation and protection of soil
- perpetuation of local culture
- clean industrial processes
- efficient logistics

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LONDON METROPOLITAN UNIVERSITY, JUNE 28-29, 2012
4- RESULTS

- Secure system from the cultivation stage to the consumption stage
- Processes to make the bean ready in few minutes by consumers
- Low environmental impact of processes (steam cooking, dehydration)
- Clean industrial processes
- Efficient logistics
- Eco-friendly packaging (material)
- Optimization of volumes and communication
- Safer production methods
- Healthier foodstuffs
- Safeguarding the competitiveness
- Advancement in the field research by direct first-hand interview to local farmers
4- RESULTS

- increasing productive activities in the area
- integration of different production activities
- niche businesses development
4- RESULTS

- Efficient mechanization in seeding and harvesting to reduce manual operations and relative costs
- Renewable energy from residues in the food chain of the same Cuneo-s bean or surrounding territory (max 20 km from the production center)
- The integrated management of the energies involved generates real advantages to local communities, not to a single company
- Increasing productive activities in the area
- Integration of different production activities
- Niche businesses development
- New values from waste materials, that becomes benefit for the area

ECONOMY
4- RESULTS

- Process
- Innovation
- Efficiency

TECHNOLOGY
lower level of water in beans by a dehumidification system
avoiding bacterial growth and biochemical reactions (if not dried)
avoiding fermentation and oxidation (if dehydrating)

power consumption minimized
only green energy used (from renewable resources)
4- RESULTS

- Application of scientific innovation in the field
- Enhancement of the know-how mainly held by the elderly
- Increasing local workplaces
4- RESULTS

- Application of scientific innovation in the field
- Enhancement of the know-how mainly held by the elderly
- Valorization of the elderly know-how
- Traditional food recipes rediscovered
- Increasing local workplaces
- The activation of different economies of scale generates new job opportunities

Systemic design guidelines used as the essential tools to understand the entire system and to define useful relationships among all the elements.
5- CONCLUSIONS

TAKING THE PROJECT FORWARD
ALTERNATIVE AGRO-FOOD NETWORK
THE DEVELOPMENT OF THE AREA

The actions of social development in rural areas that were defined with EN.FA.SI. project, can be framed at different levels of work:
THE DEVELOPMENT OF THE AREA

The actions of social development in rural areas that were defined with EN.FA.SI. project, can be framed at different levels of work:

- the consolidation of a social protection system consistent with the specific rural contexts, the present needs, and the widespread relations
THE DEVELOPMENT OF THE AREA

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- the exploitation of business systems and life styles that are based on the values of hospitality, reciprocity, and trust
THE DEVELOPMENT OF THE AREA

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- the consolidation of a social protection system consistent with the specific rural contexts, the present needs, and the widespread relations

- the exploitation of business systems and life styles that are based on the values of hospitality, reciprocity, and trust

- consumption of safe and traditional food
AN ALTERNATIVE AGRI-FOOD NETWORK

new rural development
food quality
sustainable farming
direct relationship producers-consumers
public confidence and trust in production
THANK FOR YOUR ATTENTION

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