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SYSTEMIC DESIGN

Eliana Ferrulli

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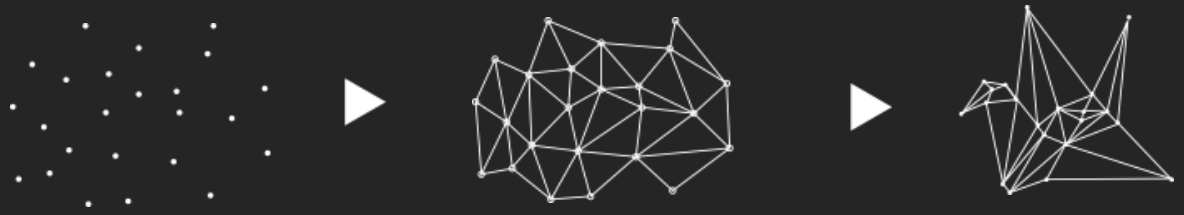

Thinking in systems through design

Eliana Ferrulli | SysLab

BIELLA, ITALY

03.02.25

Agenda

Systemic Design

Regenerative agriculture

Systems mapping through »Gigamaps«

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Let’s meet

sys Systemic Design Lab

→ Post-doctoral researcher

→ Research topics:

- Circular Economy;
- Systemic Design;
- Industrial ecosystems

→ Exploring these domains for 10 years

→ Involved in many national / EU funded projects

Agenda

Systemic Design

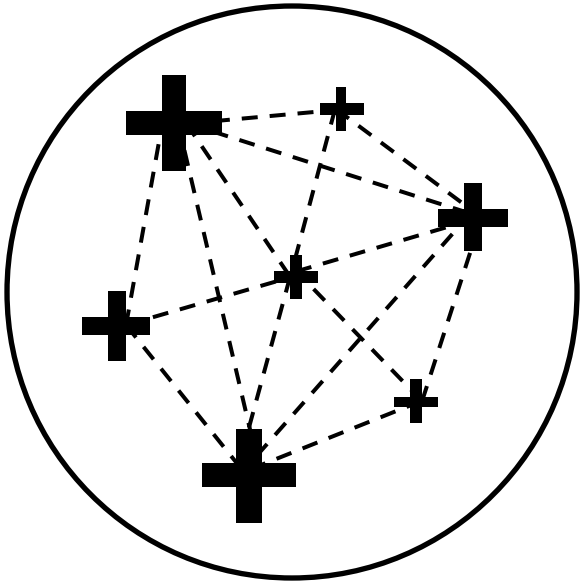
Regenerative agriculture

Systems mapping through »Gigamaps«

Systemic Design

→ **Systemic design is an approach to the design of complex systems that considers the relations between the different elements within the system.**

Through a holistic point of view, it considers the system as a whole rather than focusing on individual parts.



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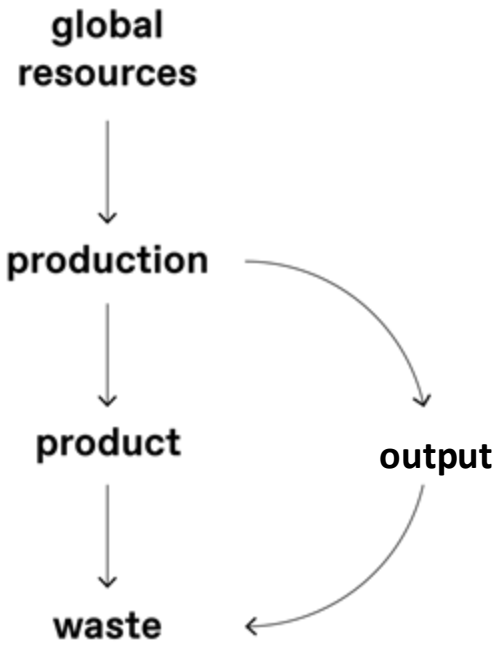
From a linear production model

→ Product = quantity
→ Economic value
→ Strong competition
→ Low interest in waste



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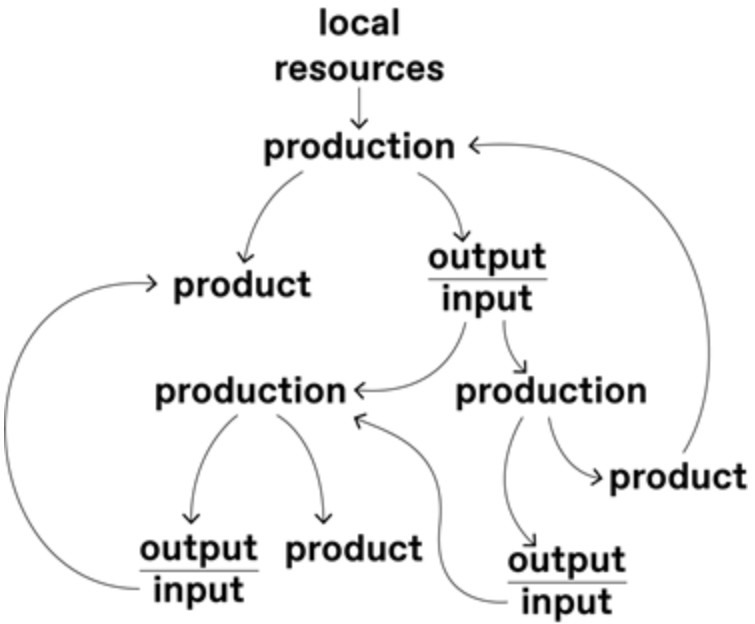
To a systemic production model

→ Balanced engagement of actors
→ Networks of local connections
→ Waste turns into a resource



Systemic Design

Principles

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Systemic Design

5 pillars

Output > Input

The outputs of a process become the inputs for another process, developing continuous flows of matter, energy and information.

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Systemic Design

5 pillars

Output > Input

The outputs of a process become the inputs for another process, developing continuous flows of matter, energy and information.

Relations

The relations between the elements of a system generate the system itself.

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Systemic Design

5 pillars

Output > Input

The outputs of a process become the inputs for another process, developing continuous flows of matter, energy and information.

Relations

The relations between the elements of a system generate the system itself.

Autopoiesis

Autopoietic systems maintain and reproduce themselves by creating their own parts, while co-evolving together with other systems.

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Systemic Design

5 pillars

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The relations between the elements of a system generate the system itself.

Autopoiesis

Autopoietic systems maintain and reproduce themselves by creating their own parts, while co-evolving together with other systems.

Act locally

The local context is prioritized, enhancing its unique material, social, cultural and economic resources.

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Systemic Design

5 pillars

Output > Input

The outputs of a process become the inputs for another process, developing continuous flows of matter, energy and information.

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The relations between the elements of a system generate the system itself.

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Autopoietic systems maintain and reproduce themselves by creating their own parts, while co-evolving together with other systems.

Act locally

The local context is prioritized, enhancing its unique material, social, cultural and economic resources.

Humanity centred design

Wicked and interrelated problems are seen through the lens of society and human beings, meant as part of a wider ecosystem.

Systemic Design
Methodology

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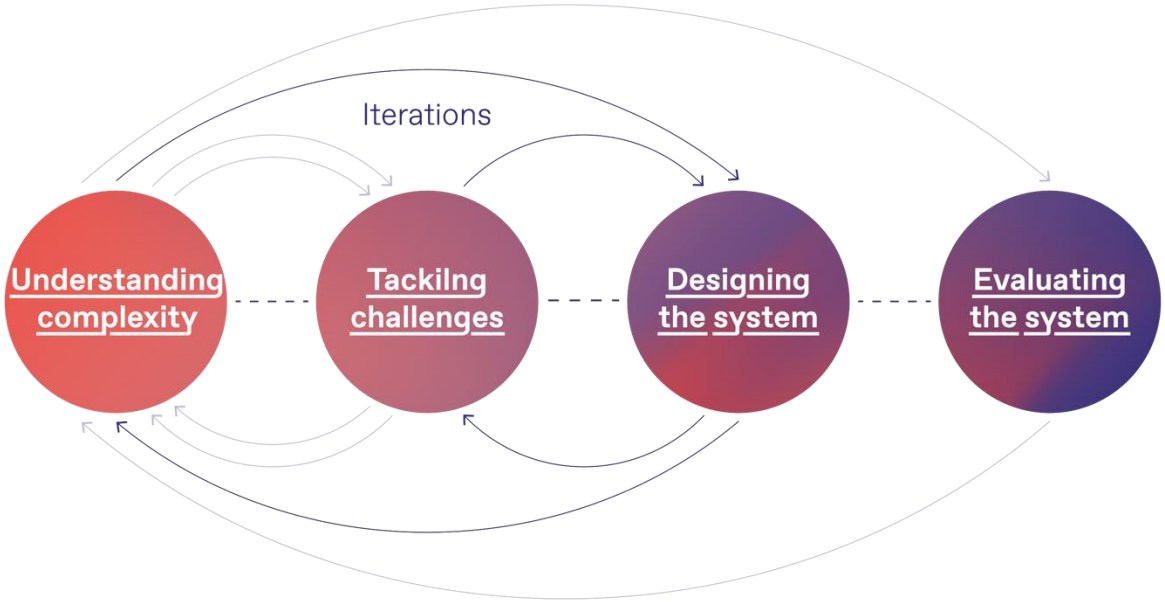
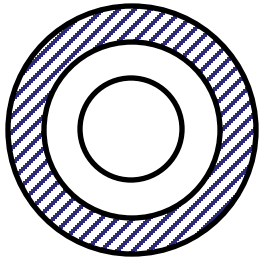
Methodology

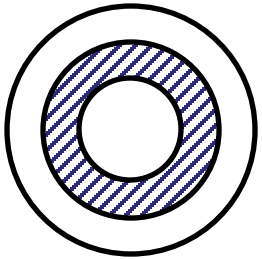
Sys Lab



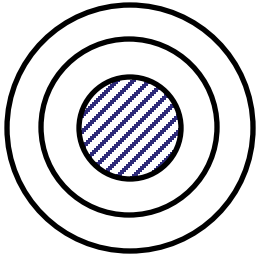
Research areas



→
Territorial enhancement



→
Industrial innovation



→
Sustainable product

How does it connect with transitions ?

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Localism

(SD principle: Act locally)

Sustainability

(SD principle: Output / input)

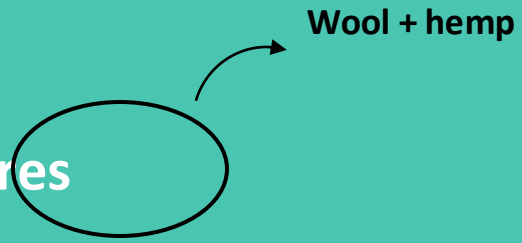
Regenerative

(SD principle: Authopoiesis)

Relations

(SD principle: Relationships)

A deep dive into regenerative fibres



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The future of the textile sector

A transition to **regenerative agriculture** is fundamental to the long-term health of the textile sector.

The long-term health of the sector will depend on how it is able to **work with farmers, local communities and ecosystems** to develop more resilient systems.

Regenerative practices offer immense **social and environmental benefits** too.

European Union, 2022

Co-funded by the European Union

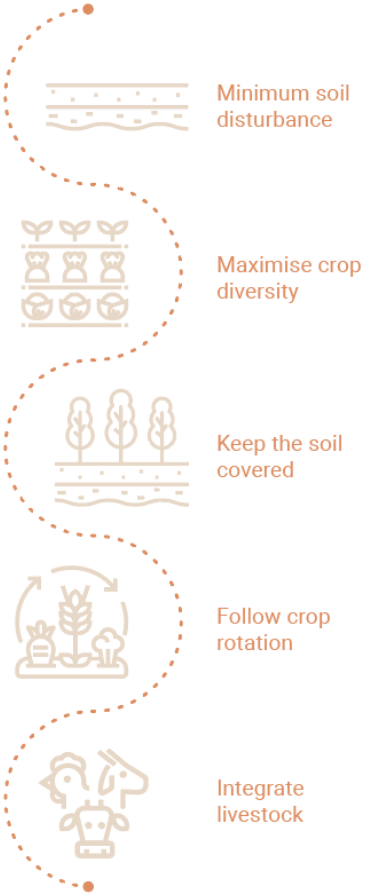
Regenerative agriculture

A holistic approach to farming and crop management, aiming to protect the soil's heath, and contribute to carbon sequestration and increased biodiversity.

Positive environmental effects:

→ Increased biodiversity
→ Improved water availability and quality
→ Climate resilience

contextual **systemic**



Regenerative fibres

Are textiles made from **renewable, biodegradable**, and often **sustainable sources**, designed to minimize environmental impact.

These fibers can be derived from **natural** sources (plants or animals) and **processed in ways that allow them to regenerate efficiently**.

They are an **essential** part for the transition to sustainable fashion and textile industry.

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Regenerative fibres

Wool

Through managed grazing:

- Improves soil health
- Increases biodiversity by maintaining natural grasslands
- Enhances water retention in soil
- Can be regenerated mechanically

Certifications:

- Regenerative Organic Certified (ROC)
- ZQ Merino (Ethical Wool Standard)
- Responsible Wool Standard (RWS)

Industrial hemp

THC <1%

- Multi-purposes usage,
- short production cycle,
- carbon-sequestering properties,
- no pesticides
- no herbicides use

A regenerative blend: MORPHO

A fabric for interiors, made of **hemp** grown in England blended with **post-consumer recycled cashmere**.
It is fully traceable, circular, naturally fire-retardant, and carbon-sequestrating.

MORPHO is a demonstration of a systemic design approach and regenerative agriculture in textile manufacturing.

https://worth-partnership.ec.europa.eu/projects/morpho_en

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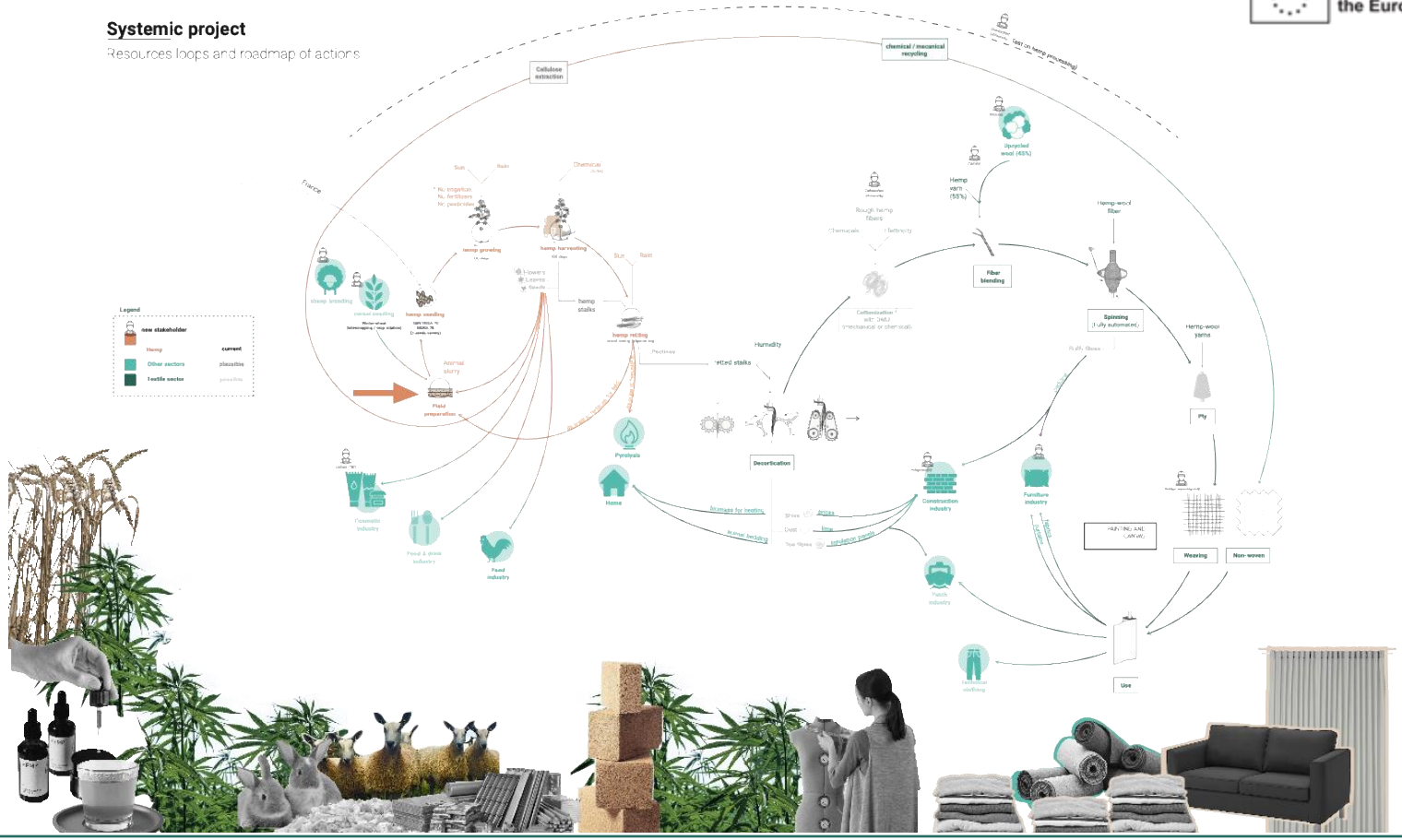
Systemic project

Resources loops and roadmap of actions



Politecnico di Torino

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Goal

- What could be the potential of hemp in the region?
- Could it support the wool ecosystem to be more local and circular?

Agenda

Systemic Design

Regenerative agriculture

Systems mapping through »Gigamaps«

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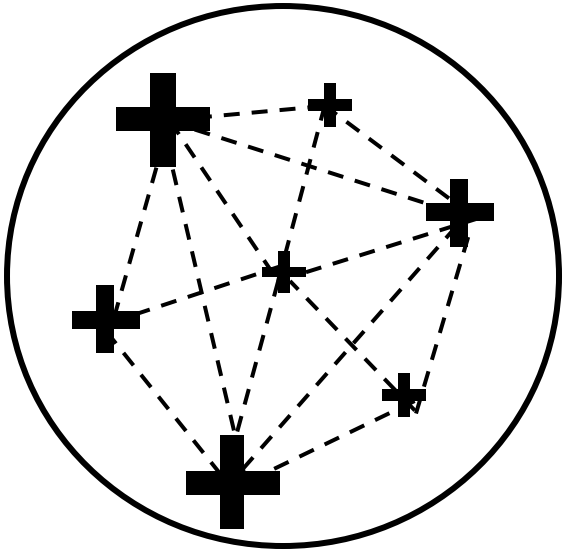
What is a system?

- A set of elements working together for a purpose.

Donella Meadows



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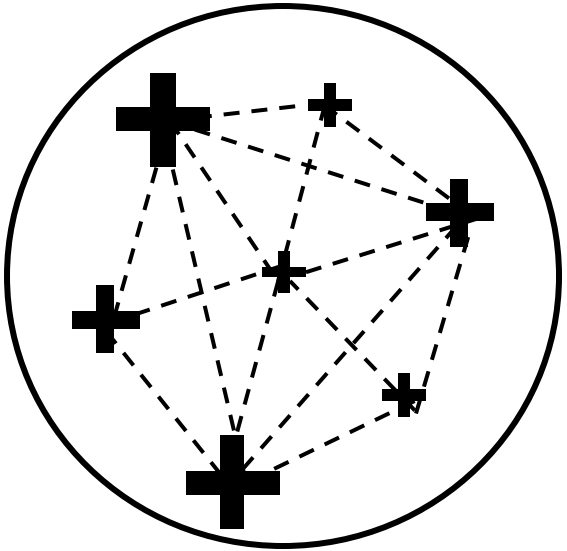
What is a system?

- Elements
- Relationships
- Purpose



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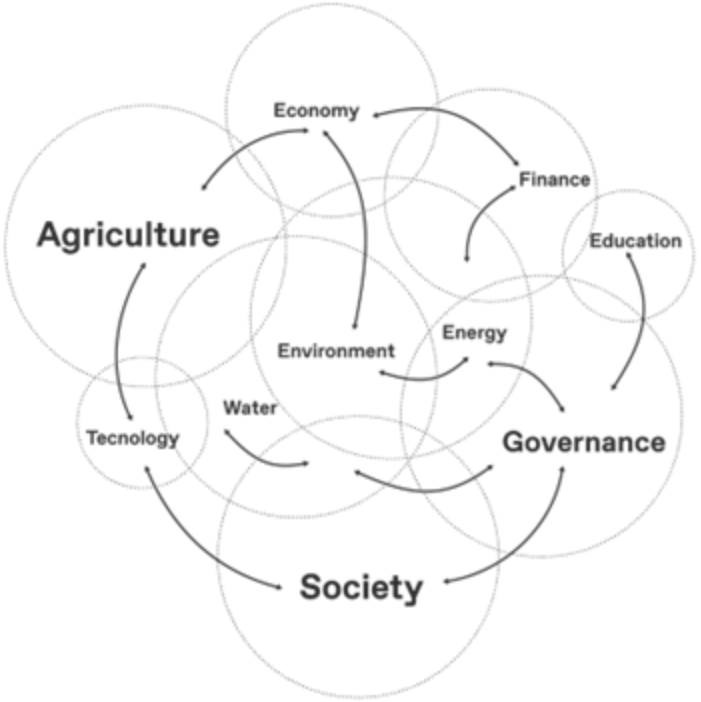
But we live in a world of systems



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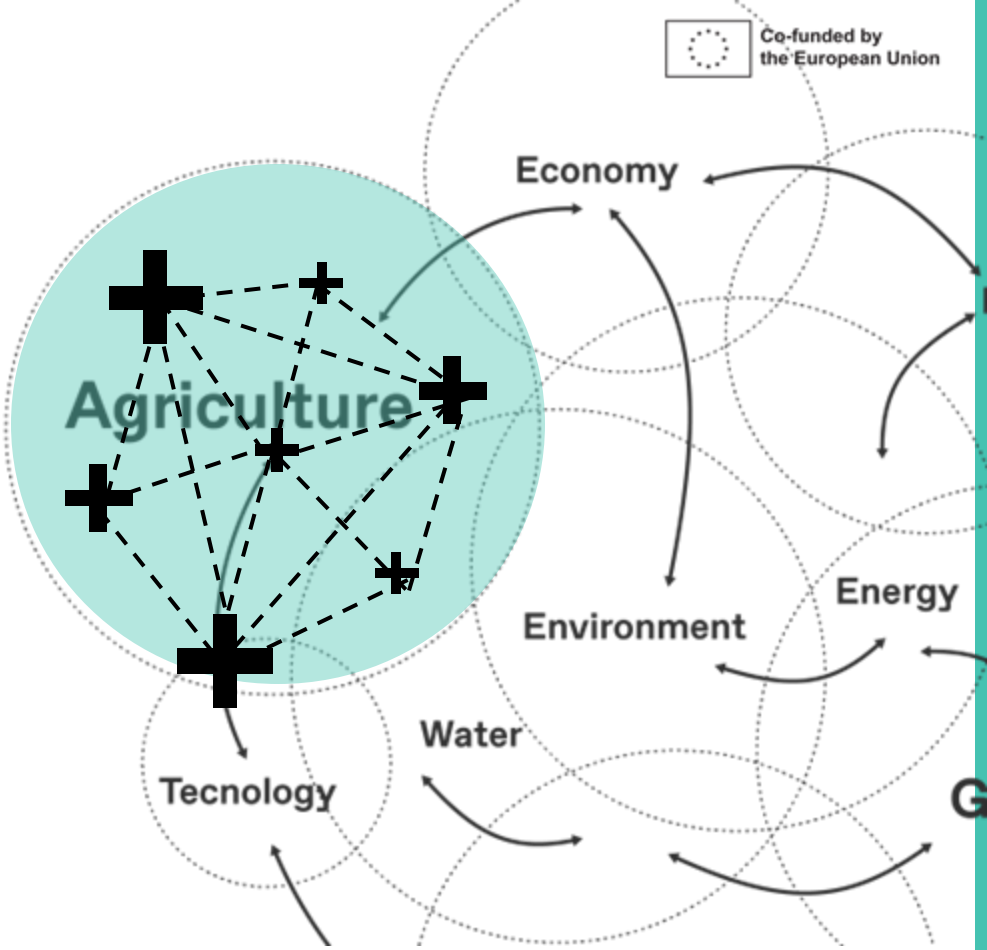
Why systems mapping?

→ To reveal the underneath structures of a system and visually represent them to collectively make sense of the system and have a shared understanding.



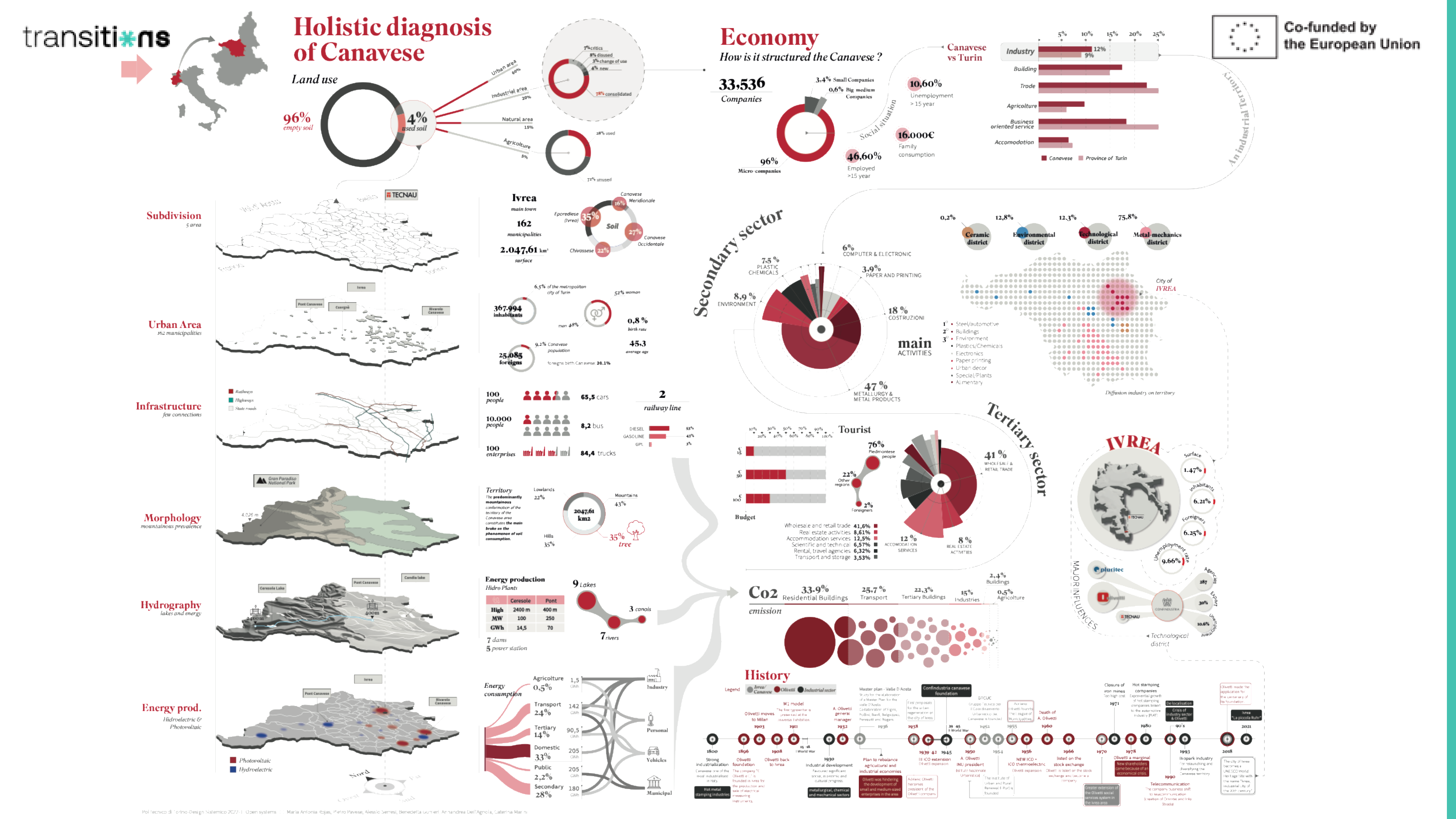
How to systems mapping?

- → Define the boundaries of the system of interest
- → Start the data collection (secondary sources + key stakeholders)
- → Analyse, visualize and interpret data (missing link, feedback loops, challenges, opportunities)
- → Create the map and validate with key stakeholders

We do this through «gigamaps»

- → **A key tool by Systemic Design to systems map**
- → Give us a holistic perspective
- → Help us to visualise and understand the research contex, and suggest the leverages for change
- → Enables an horizontal dialogue among parties

Let’s see some examples



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Holistic diagnosis of Canavese
Land use
96% empty soil
4% used soil
Urban area 60%
Industrial area 20%
Natural area 15%
Agricolture 5%
7% critics
8% disused
3% change of use
4% new
78% consolidated
28% used
72% unused
Subdivision
5 area
Urban Area
162 municipalities
Infrastructure
few connections
Morphology
mountainous prevalence
Hydrography
lakes and energy
Energy prod.
Hidroelectric & Photovoltaic
Photovoltaic
Hydroelectric
TECNAU
Ivrea
main town
162
municipalities
2.047,61 km²
surface
Soil
35%
Eporediese (Ivrea)
16%
Canavese Meridionale
27%
Canavese Occidentale
22%
Chivassese
367.994
inhabitants
6,5% of the metropolitan city of Turin
52% woman
men 48%
0,8 %
birth rate
45.3
average age
25.085
foreigns
9,2% Canavese population
100 people
65,5 cars
10.000 people
8,2 bus
100 enterprises
84,4 trucks
2
railway line
DIESEL
GASOLINE
GPL
Territory
Lowlands
22%
Mountains
43%
Hills
35%
2047,61 km2
35% tree
Energy production
Hidro Plants
7 dams
5 power station
9 Lakes
3 canals
7 rivers
Energy consumption
Agricolture 0,5%
Transport 24%
Tertiary 14%
Domestic 33%
Public 2,2%
Secondary 28%
Industry
Personal
Vehicles
Municipal
Economy
How is it structured the Canavese ?
33.536
Companies
3,4% Small Companies
0,6% Big medium Companies
96%
Micro-companies
Social situation
10,60%
Unemployment > 15 year
16.000€
Family consumption
46,60%
Employed >15 year
Canavese vs Turin
Industry
Building
Trade
Agricolture
Business oriented service
Accomodation
12%
9%
Canavese
Province of Turin
An industrial Territory
Co-funded by the European Union
Secondary sector
6% COMPUTER & ELECTRONIC
3,9% PAPER AND PRINTING
7,5% PLASTIC CHEMICALS
8,9 % ENVIRONMENT
18 % COSTRUZIONI
47 % METALLURGY & METAL PRODUCTS
main ACTIVITIES
Steel/automotive
Buildings
Environment
Plastics/Chemicals
Electronics
Paper printing
Urban decor
Special Plants
Alimentary
0,2%
Ceramic district
12,8%
Environmental district
12,3%
Technological district
75,8%
Metal-mechanics district
City of IVREA
Diffusion industry on territory
Tertiary sector
Tourist
76%
Piedmontese people
22%
Other regions
2%
Foreigners
Budget
41 %
WHOLESALE & RETAIL TRADE
12 %
ACCOMODATION SERVICES
8 %
REAL ESTATE ACTIVITIES
Wholesale and retail trade 41,6%
Real estate activities 8,61%
Accommodation services 12,5%
Scientific and technical 6,57%
Rental, travel agencies 6,32%
Transport and storage 3,53%
IVREA
Surface
1.47%
Inhabitants
6.21%
Foreigners
6.25%
Unemployment rate
9.66%
MAJOR INFLUENCES
pluritec
Olivetti
TECNAU
CONFINDUSTRIA
Technological district
Co2 emission
33.9% Residential Buildings
25,7 % Transport
22,3% Tertiary Buildings
15% Industries
2,4% Buildings
0,5% Agricolture
History
Legend
Ivrea/Canavese
Olivetti
Industrial sector
1800
Strong industrialization
1896
Olivetti foundation
1903
Olivetti moves to Milan
1908
Olivetti back to Ivrea
1911
M1 model
1915 - 18
I World War
1930
Industrial development
1932
A. Olivetti general manager
1936
Plan to rebalance agricultural and industrial economies
Master plan - Valle D Aosta
1938
1939 - 42
1945
Confindustria canavese foundation
39 - 45
II World War
1950
A. Olivetti INU president
1952
1954
1955
1956
NEW ICO + ICO thermoelectric
1960
Death of A. Olivetti
1966
listed on the stock exchange
1970
1971
Closure of iron mines
1978
Olivetti a marginal
1980
Hot stamping companies
1990
Telecommunication
90's
Delocalisation
1993
Biopark industry
2018
2021
Ivrea "La piccola Ruhr"
Politecnico di Torino-Design Sistemico 2020 | Open systems

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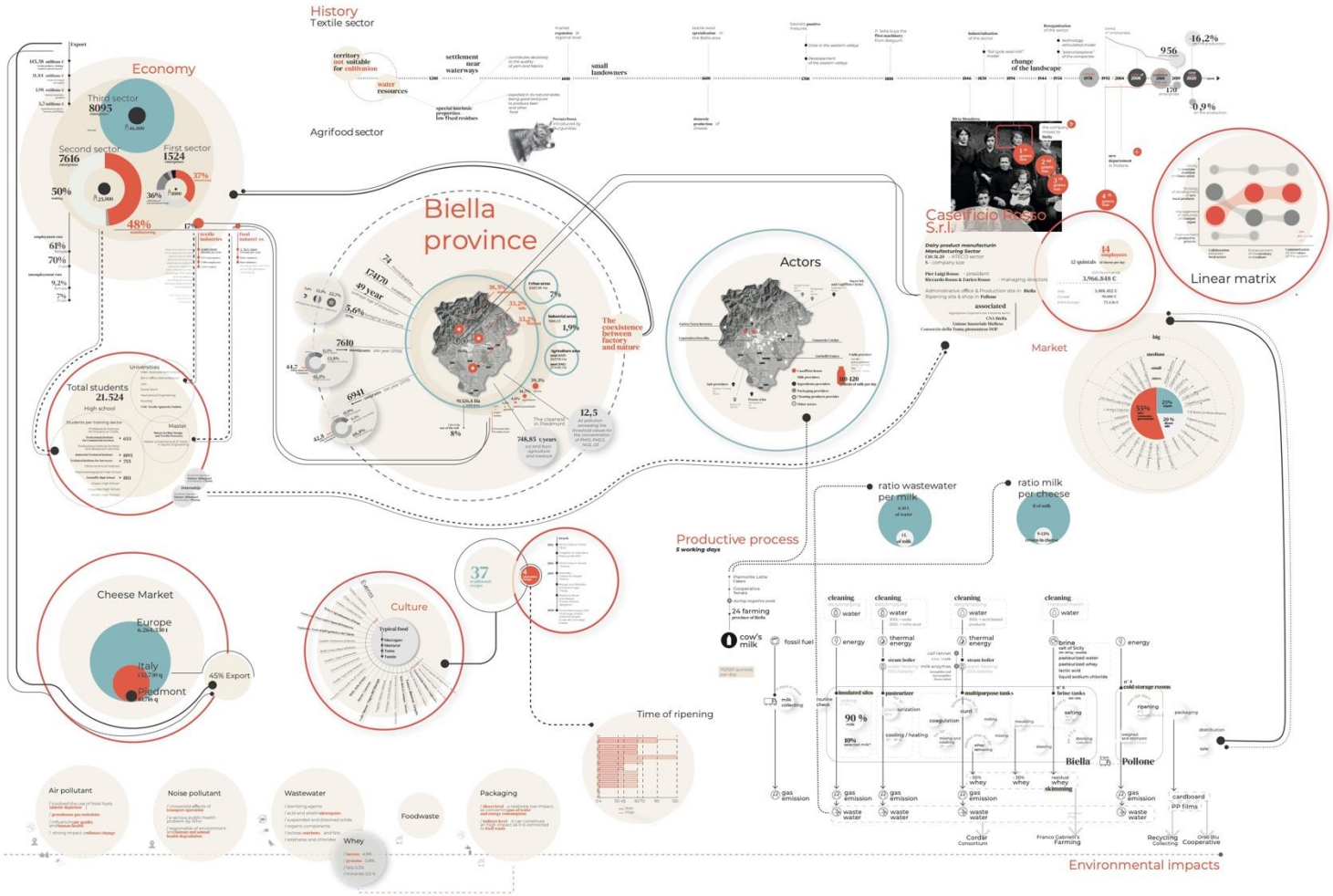
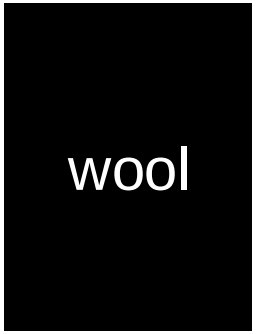


What does it take?

- → Months of desk research (literature, report, official databases) & field research (interviews, observations, workshops)
- → Input / output flow analysis; stakeholders mapping
- → Analysis, interpretation, visualisation

Stop talking, start doing

- → Let's make 2 groups
- → Let's map the wool and the hemp value chains



Stop talking, start doing

→ **Follow the canvas provided**

→ Order the steps of the value chain

→ Write down the resources in input and output

→ Identify the relevant **stakeholders**

→ Identify the relevant policies

Comments and final remarks

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Thank you!

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