

Faculty of Design

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## Design Circular Colours: A cross-sectoral project for the systemic design of regional dyeing value chains

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# Design circular colours.

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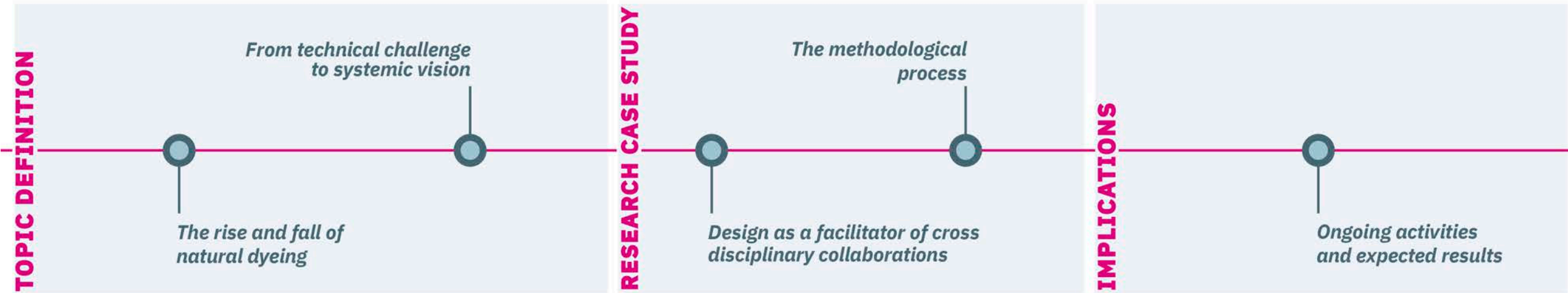
**A cross-sectoral project for the systemic design of regional  
dyeing value chains.**

Amina Pereno, Asja Aulisio, Silvia Barbero

TU Delft | November 6<sup>th</sup>, 2021

RSD10 - 10<sup>th</sup> Relating Systems Thinking & Design Symposium  
Track 16: on critical contexts and circularity

## /Presentation steps



## /Historical context *of natural dyeing plants*

### 15th and 17th centuries

Dyeing plants were **cultivated** in **several European countries**, in particular Italy, France, Germany and England

### **DYEING PLANTS IN EUROPE**

### 16th century

A major shock due to the **introduction into Europe of Indian indigo** produced by the Indigofera dye works

### **INDIAN INDIGO**

### At the end of the 19th century

The **chemical synthesis** led to the definitive disappearance of cultivation in Italy and the rest of Europe

### **CHEMICAL SYNTHESIS**

### Nowadays

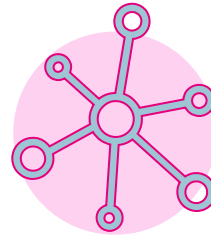
**Research** into natural plant dyes was **resumed**

### **NEW SUSTAINABLE INTERESTS**

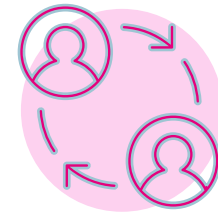
## / Socio-technical complexity and challenges *of circular economy framework*



**experimentation** to improve dye extraction and **extend their application** to new sectors



**systemic design** methods and tools can establish **learning processes** for developing **circular systems**



**co-design** new processes, services, systems and ways of living



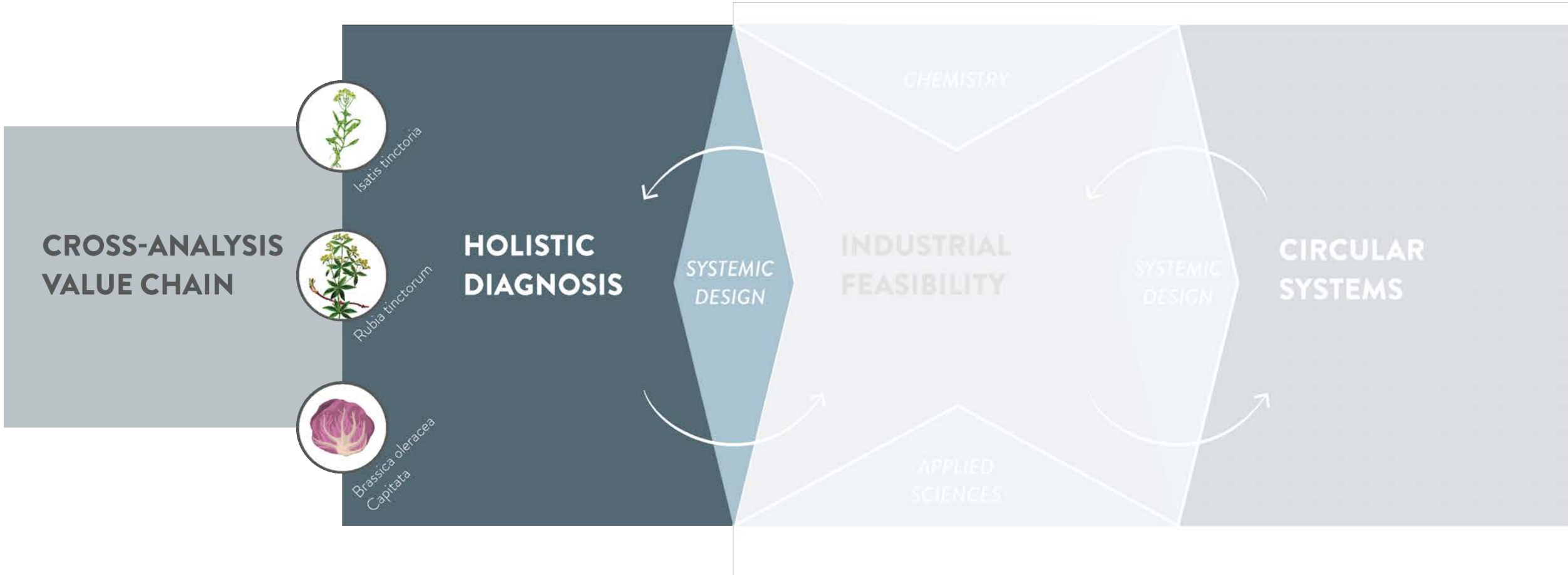
The ECOLOR project aims at **investigating** the development opportunities of **natural dyeing** value chains in the **Piedmont Region** (Italy), within a **circular economy framework**.

*Funded by ERDF ROP 2014-2020  
Piedmont Region - ECOLOR project*

## /Sperimentation: circular system solution development

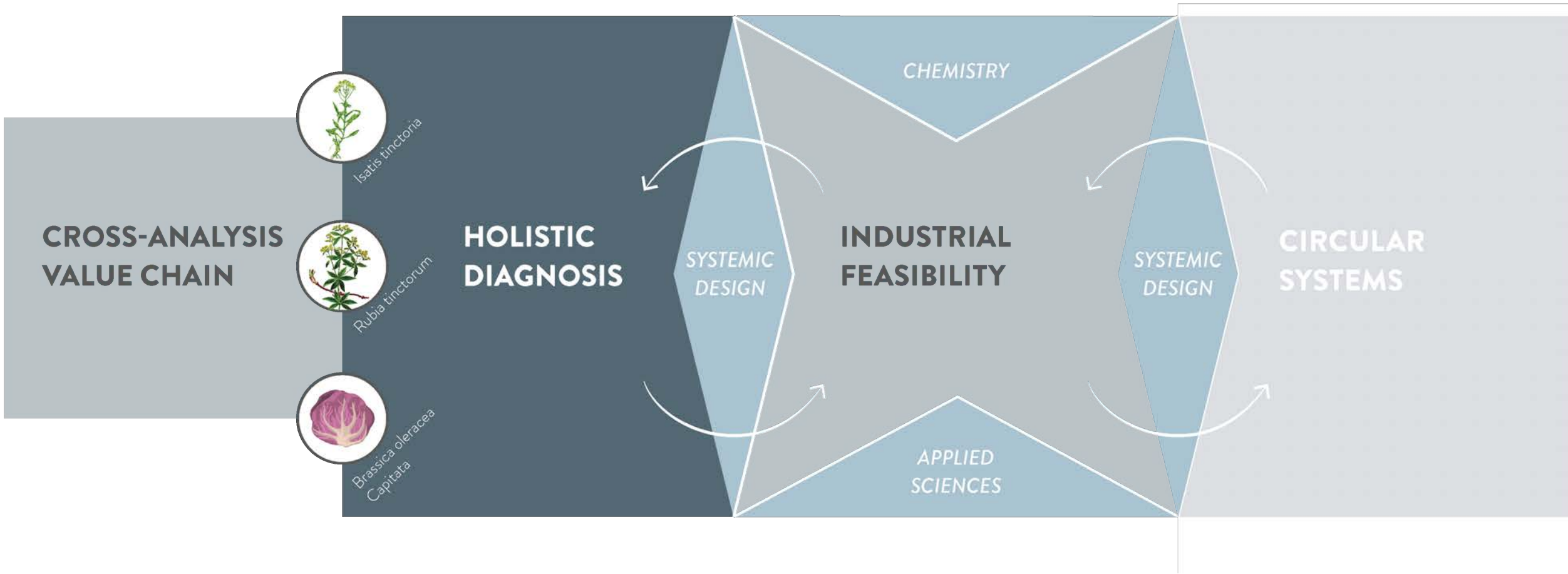


## /Sperimentation: circular system solution development

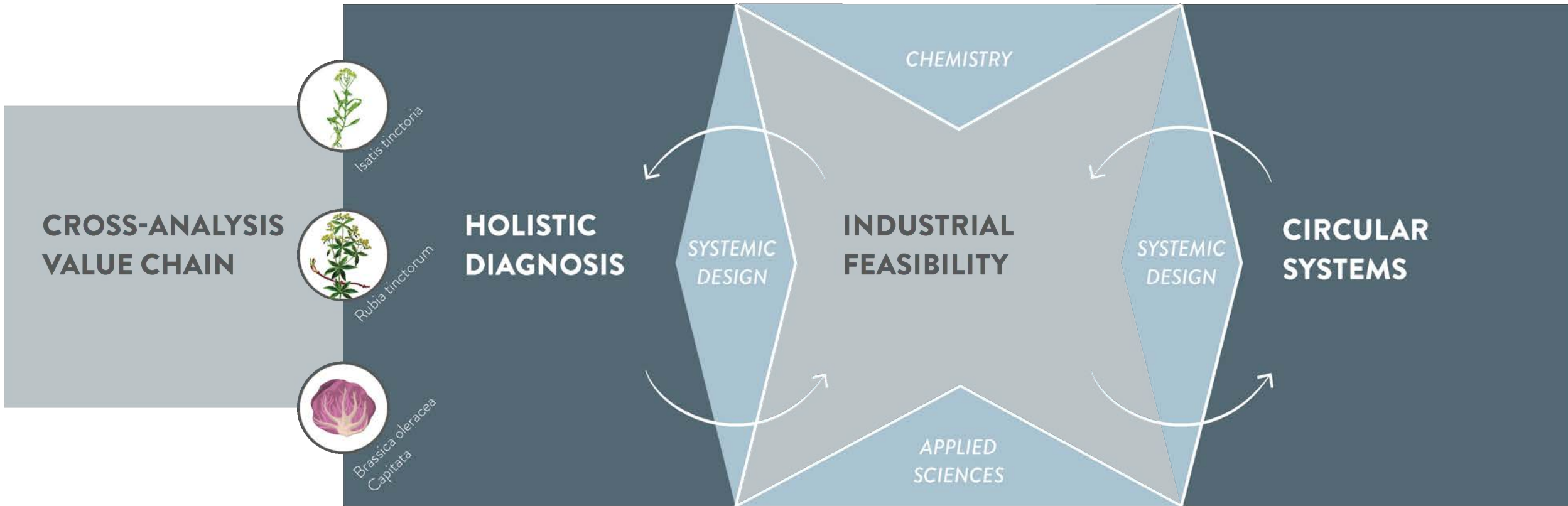




## /Sperimentation: circular system solution development



## /Sperimentation: circular system solution development



## / Theoretical potentialities

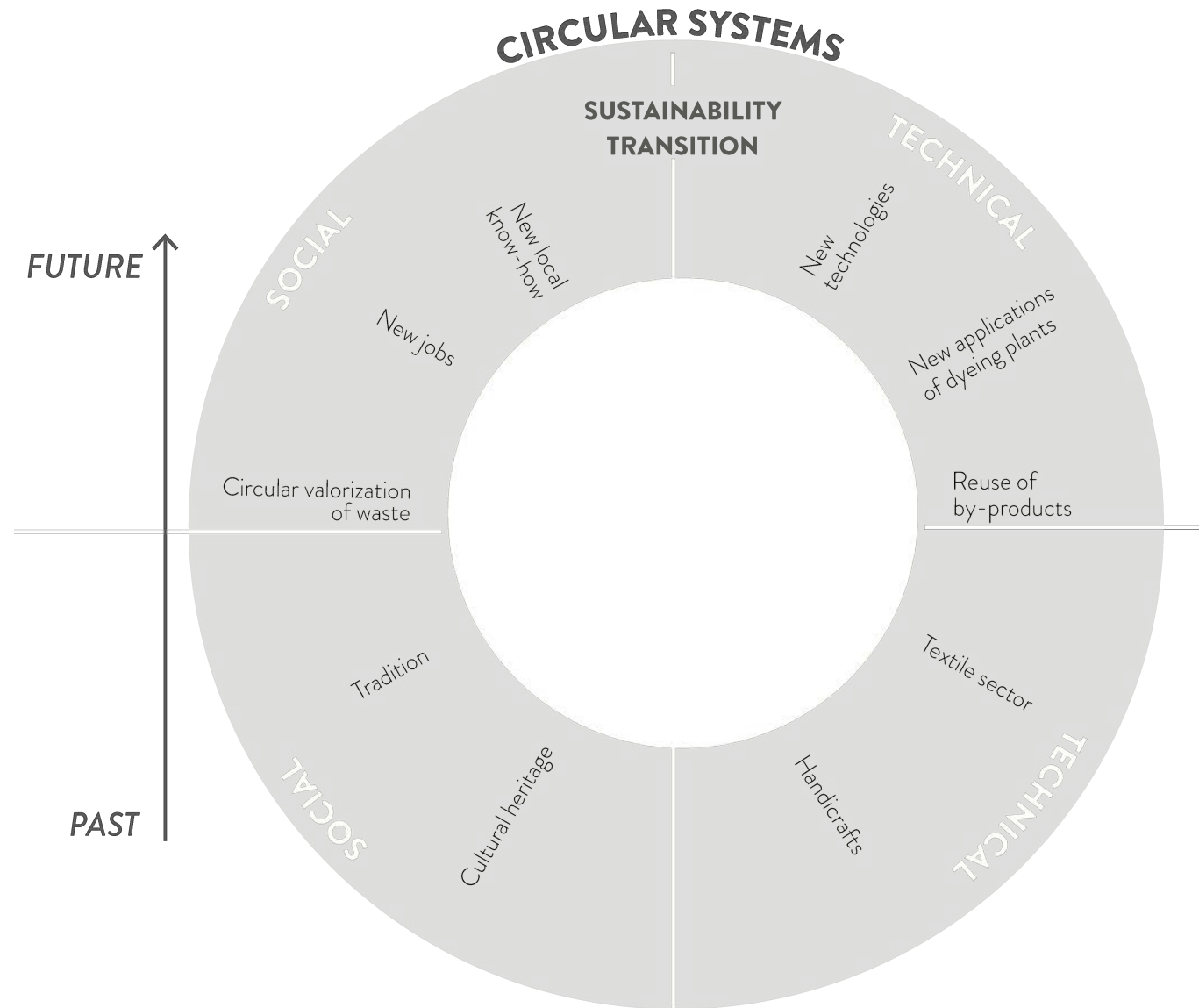
The project **(re)builds a decayed regional supply chain** and opens several possible pathways and reflections for **practical implementation** of systemic methods.

## /Practical tensions

### *Socio-cultural and technical transition*

FROM PAST TO FUTURE  
(BUT WITHOUT A PRESENT!)

- **Technical innovation needed:** from handicraft of the past to industrial know-how of the future, in a new context.
- **Socio-cultural renaissance:** decayed tradition could lay the foundations for new sustainable practices.
- **Radically new socio-technical systems:** building a system from scratch, enhancing the present without forgetting the past

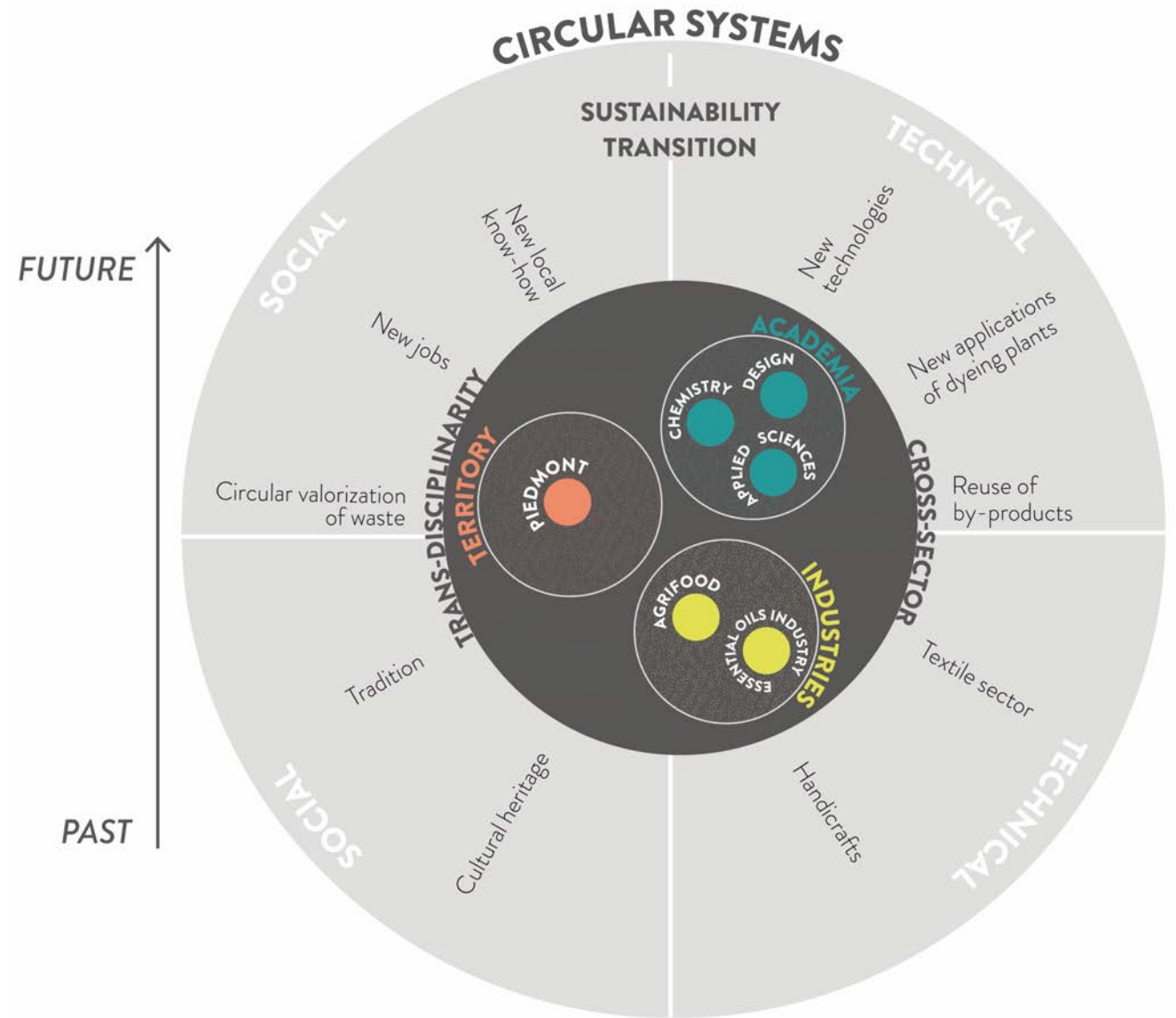


## /Practical tensions

### *Multi-stakeholder and cross-sectoral context*

A COMPLEX COLLABORATION WITH DIFFERENT (AND DIVERGENT) VISIONS

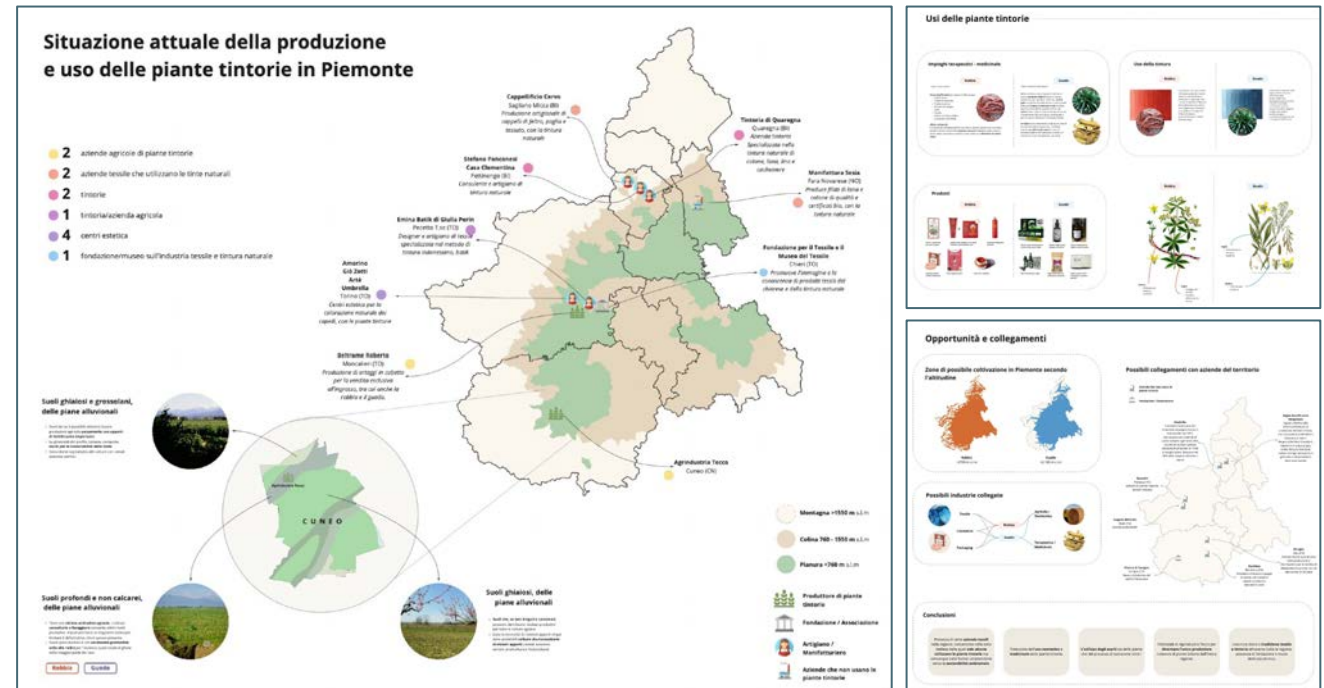
- **Industrial pragmatism:** vision is often focused on the new product(s), not the new system
- Collaboration with chemistry and engineering is crucial, but it is not easy to **share common system-wide macro-objectives**.
- **Challenges in designer's role:** the ability to framing the system is recognised but the role of mediator is not always accepted in technical matters.





# 1. Frame the system

**State-of-the-art analysis** of local dyeing culture products with Holistic Diagnosis method on woad, madder and red cabbage



Holistic Diagnosis graphic representation  
by MSc students Aldemir Arda and Molina Galindo Vanessa Bibiana

## /Current experimentation

### 1. Frame the system

**State-of-the-art analysis** of local dyeing culture products with Holistic Diagnosis method on woad, madder and red cabbage

### 2. Test new processes

Preliminary **drying and extraction experiments** on the three dyeing products identified



## /Current experimentation

### 1. Frame the system

**State-of-the-art analysis** of local dyeing culture products with Holistic Diagnosis method on woad, madder and red cabbage

### 2. Test new processes

Preliminary **drying and extraction experiments** on the three dyeing products identified

### 3. Evaluate new applications

Definition of **new possible industrial application** (paper and plastic colouring)





## /Future directions

Carry out an industrial project that **combines technical feasibility, environmental sustainability and socio-cultural development** of the new value chain.  
Strengthen a **common vision** between different sectors and disciplines.

## /Open questions

*Which are the impacts of new socio-technical systems on local populations and society?*

*What impacts do the new crops have on local eco-systems?*

*Is it possible to boost other local industries by promoting a sustainable transition?*

# Thank you.

## Contacts

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