

A systemic description of the dairy value chain's contribution to Inclusive Sustainable Development in highlands



Andrea Ceppatelli

Claudio Pozo

Celeste Bonnet

Mariana Vogg

Peg Strankman

Liz Wedderburn

Enrico Sturaro

Session 10. Livestock are more than food, Part 1

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the MSCA grant agreement No 872328



General context

HIGHLANDS.3

01/08/2020



31/08/2025

9 Research Innovation sessions (R&IS) on various highlands locations throughout the world

International participants with transdisciplinary backgrounds

Interviews to local initiatives representative of Inclusive Sustainable Development in Highlands

Creation of a database with data from all the interviews



General context

Highlands

Vital for humanity: several ecosystems hosted; provision of multiple goods and services

Geographical, economical, and social entities

Climate – Natural – Cultural heritage

Inclusive Sustainable Development in Highlands (ISDH)

Meeting the needs of the present without compromising future generations

Promoting wellbeing, reducing inequalities

Long-term viability of economic, social, environmental systems

Collective contribution to create opportunities and in decision making

Sharing the benefits of the economic growth, leaving no one behind



General context



**Dairy production
In Highland**

High-quality products

Economic revenues

Landscape maintenance

Supporting biodiversity

Carbon storage

Lower yields

Higher production costs

Abandonment of land and traditional low-input farms



Methodology

- Aim → **To investigate the benefits of the dairy value chain beyond food provision, and its contribution to inclusive sustainable development in highlands**
- Analysis of interviews from 11 dairy initiatives in three regions *Alps, Pyrenees, Massif Central*
- ***“What are the factors and relationships that describe the dairy value chain’s contribution to ISDH?”***
- **Systems thinking approach**
- Classification of factors within similar topics, clustered under a common title
- *Causal Loop Diagram* (CLD) for each region constructed on the relationships between the factors
- Development of **integrated CLD** merging the three regional ones
- Within the CLD, identification of: reinforcing loops, subsystems, points of leverage for system change

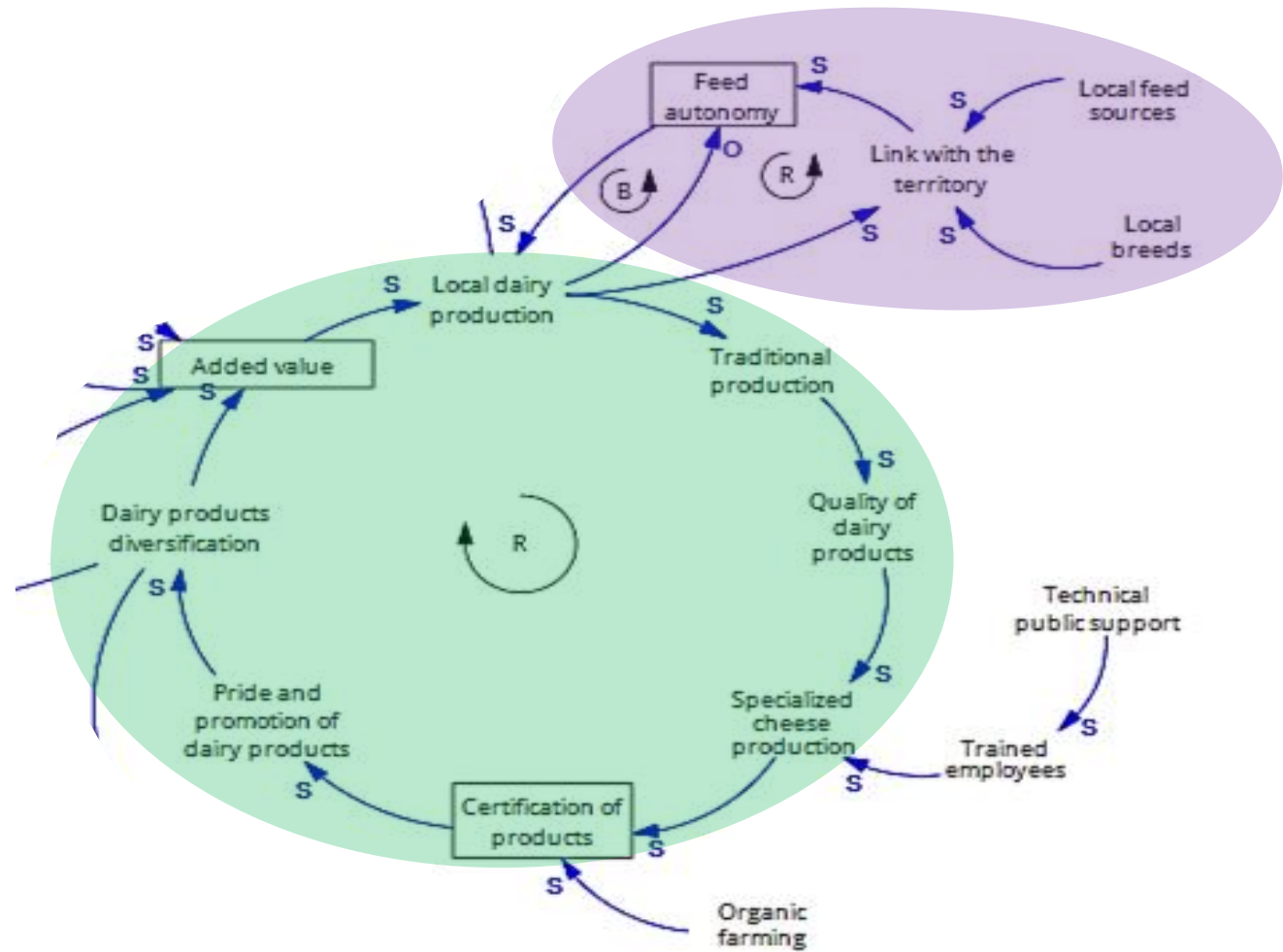
Integrated Causal Loop Diagram



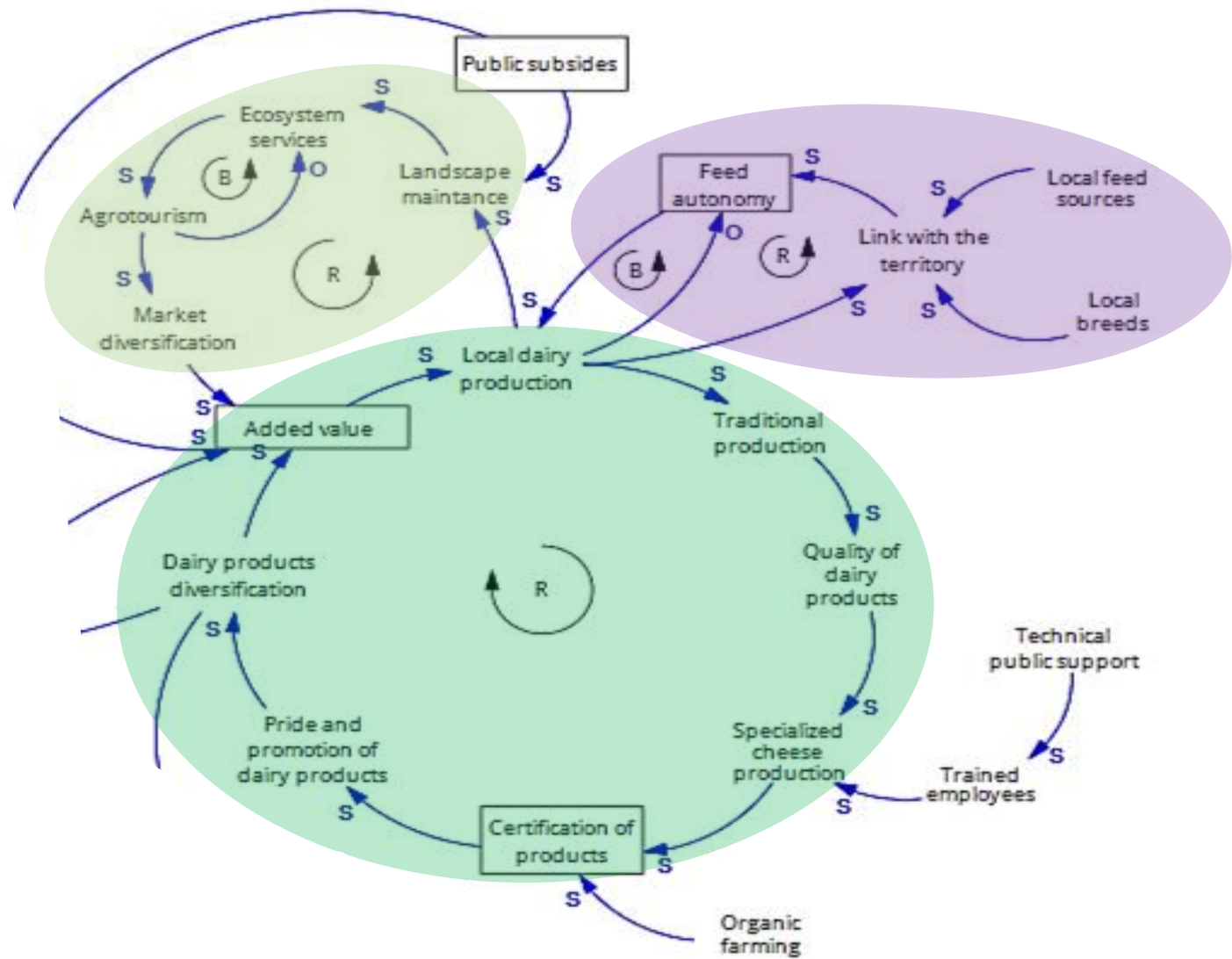
Local resources

Integrated Causal Loop Diagram

- Local resources
- Dairy production

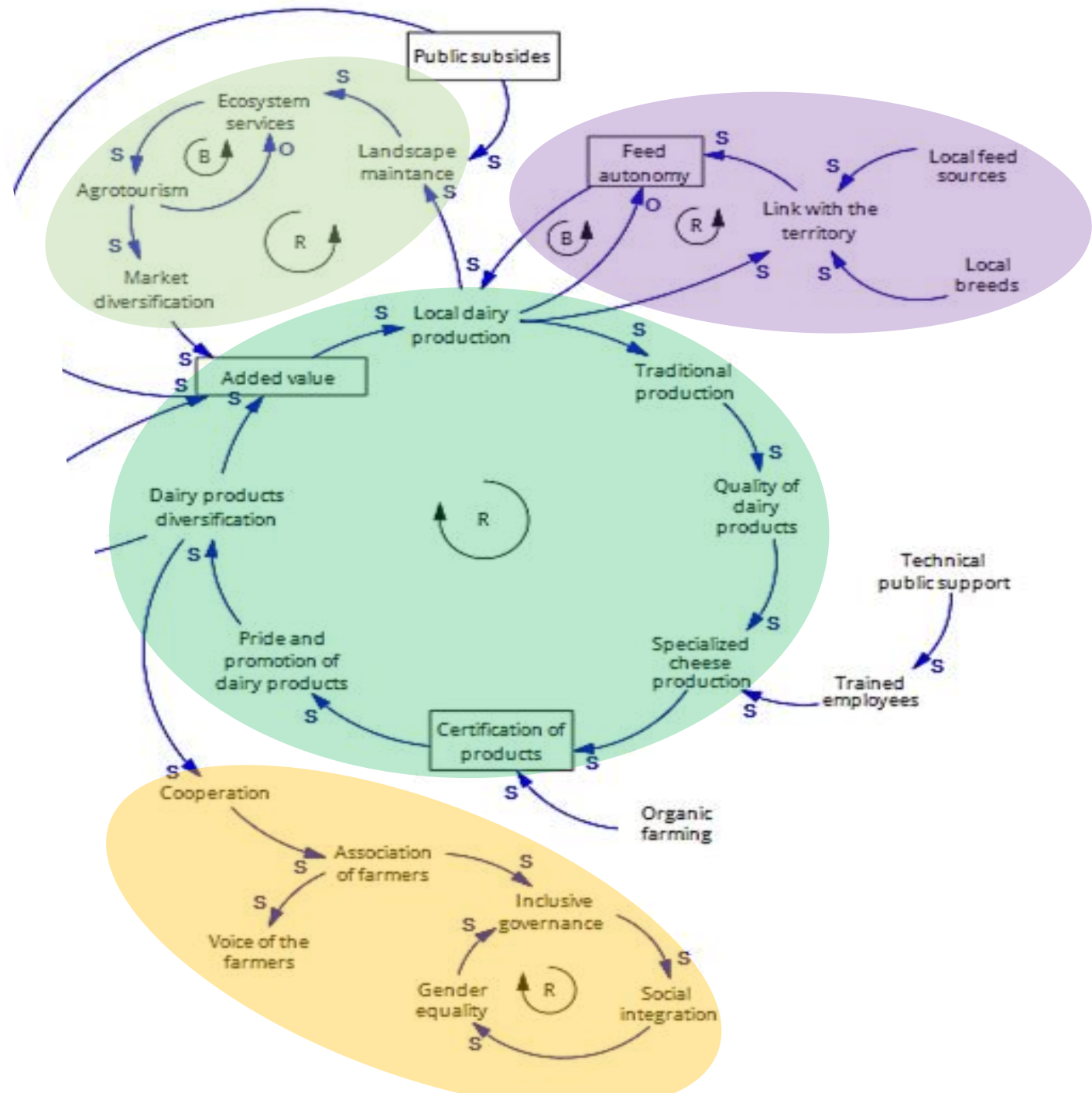


Integrated Causal Loop Diagram



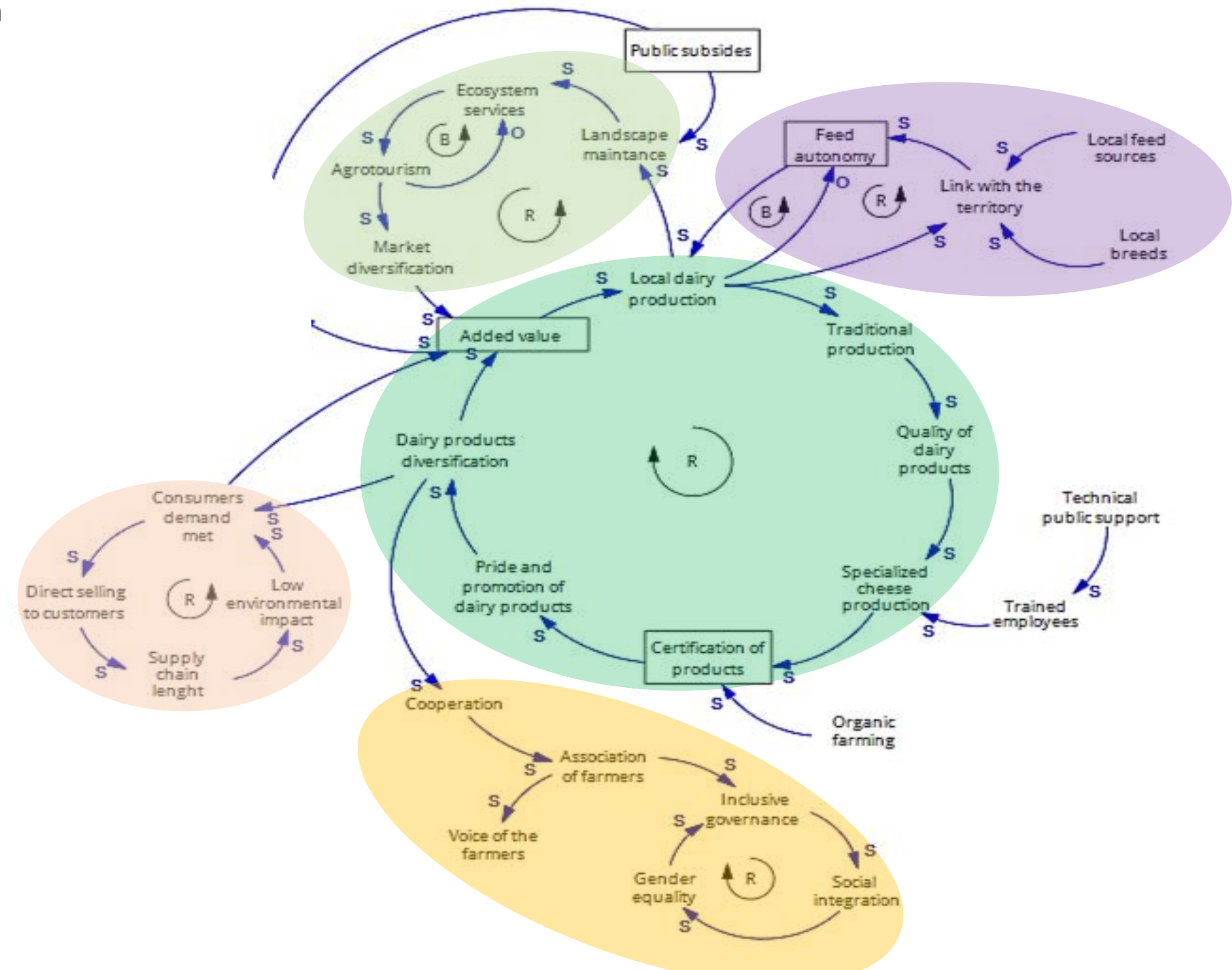
- Local resources
- Dairy production
- Environment

Integrated Causal Loop Diagram



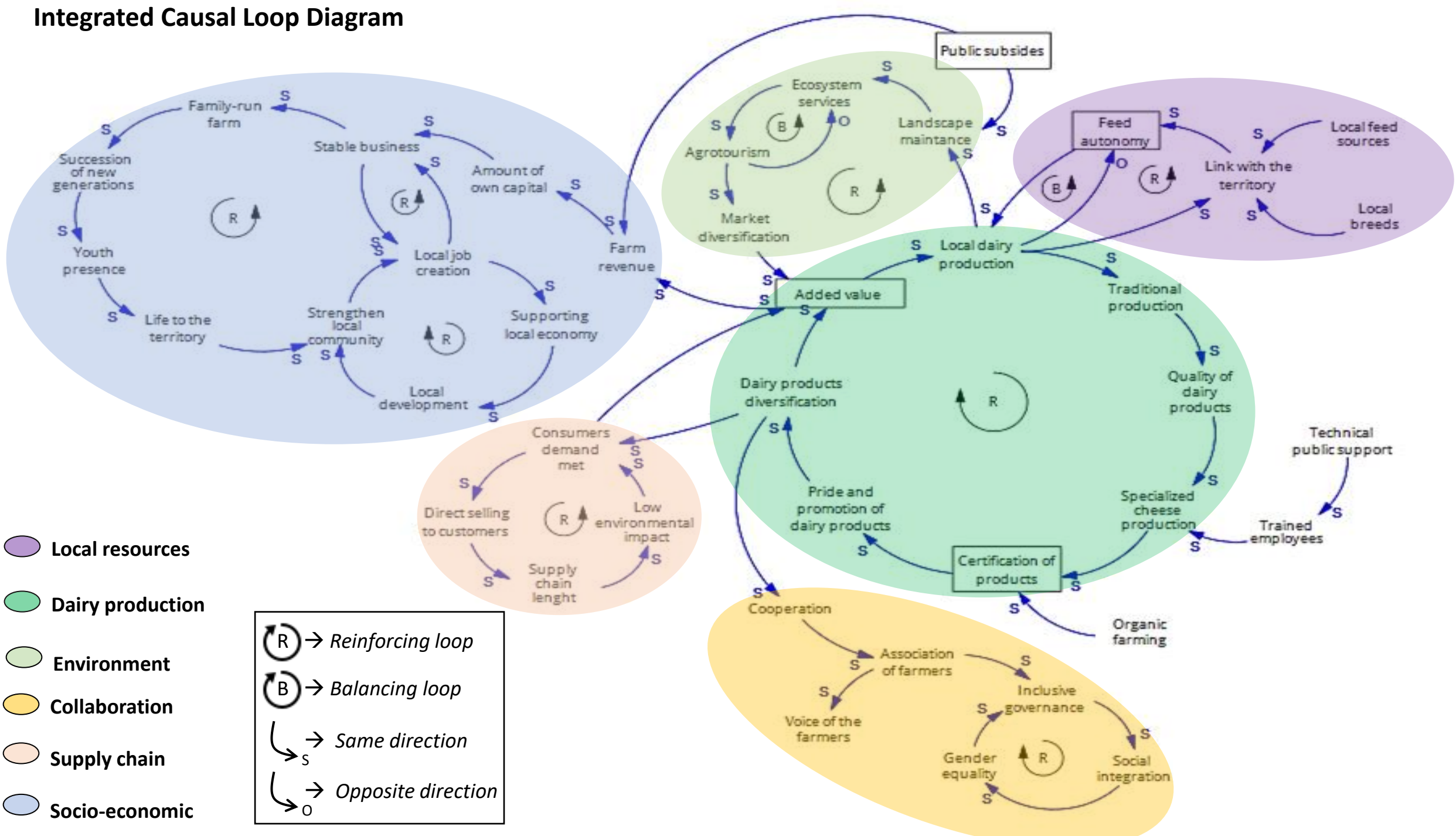
- Local resources
- Dairy production
- Environment
- Collaboration

Integrated Causal Loop Diagram



- Local resources
- Dairy production
- Environment
- Collaboration
- Supply chain

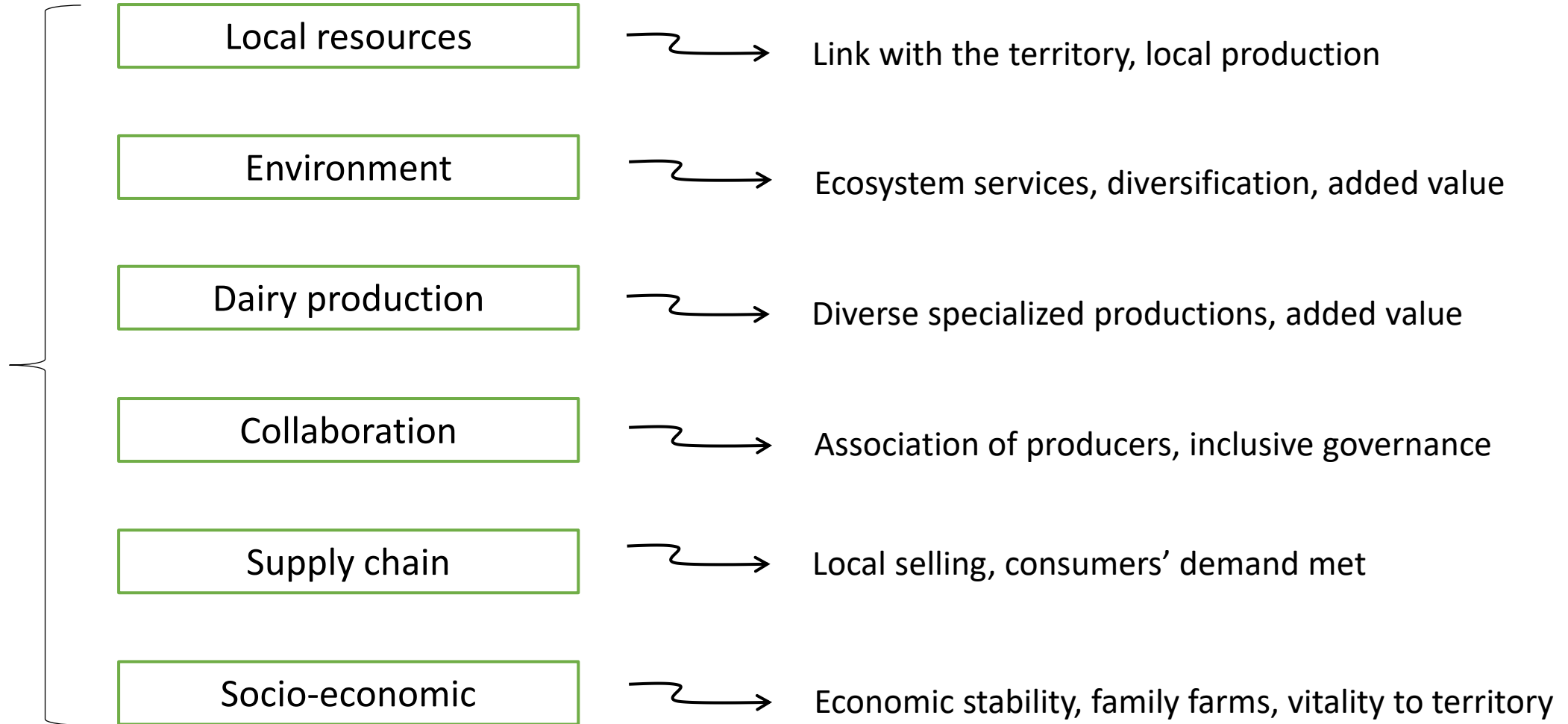
Integrated Causal Loop Diagram





Results - Subsystems

Subsystems

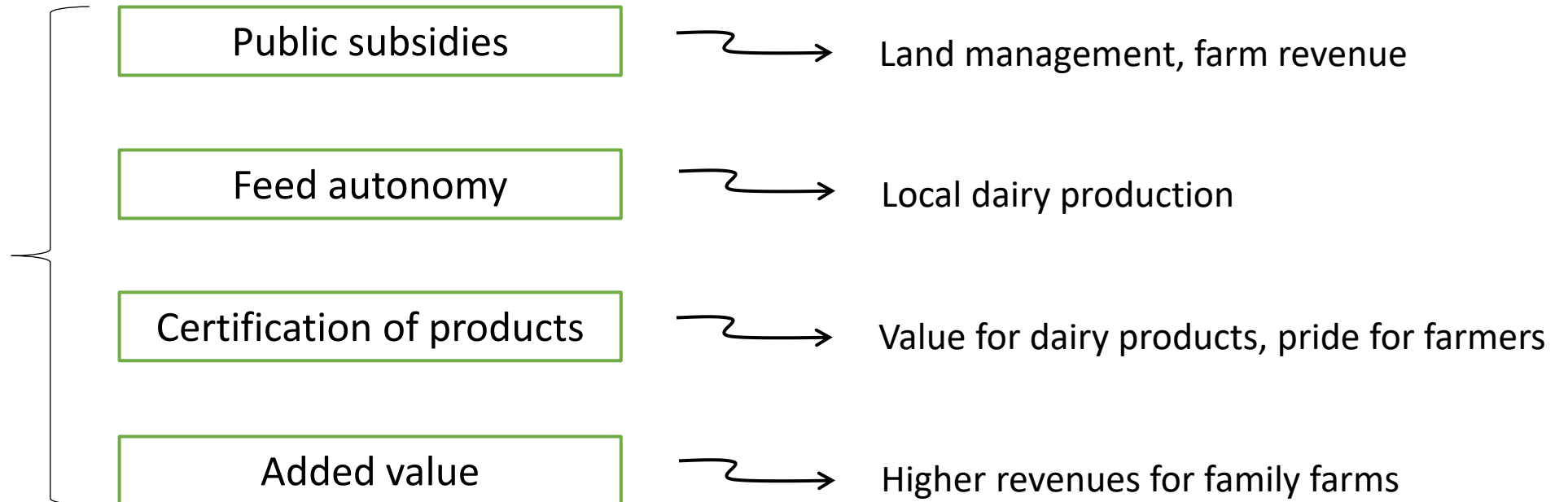




Results – Leverage points

- **Points of leverage for system change**, identified in the CLD by exploring the impact of specific variables throughout the system

Leverage points





Discussion

Dairy value chain in highlands



Multiple benefits beyond food production

**System thinking
approach**

Analysis of the system in its complexity, investigating on the interconnections and relationships between the factors

Identification of leverage points where to act to generate system-wide impacts, enhancing positive and mitigating negative cycles

Interpretation of the actors' view, from the interviews

- **Public entities** (EU and local authorities) → laws and regulations; public subsidies to farmers
- **Rural planners** → Design of Rural Development Programmes
- **Farmers** → actions and strategies to counter barriers (succession, lack of skilled workers)



Conclusion

Dairy value chain

- Multiple **benefits** beyond food production
- Contribution to **ISDH**

Integrated model (CLD)

- **Complexity** of the dairy value chain
- Identification of **factors** contributing to ISDH and their **interconnections**

- **Decision-making tool** for stakeholders
- Implementation of **strategic and integrated interventions** to support the dairy value chain in highlands



***THANK YOU FOR
YOUR ATTENTION***

andrea.ceppatelli@phd.unipd.it

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the MSCA grant agreement No 872328