An Integrated Resilience and Sustainability Transition Framework for SMEs in North Africa

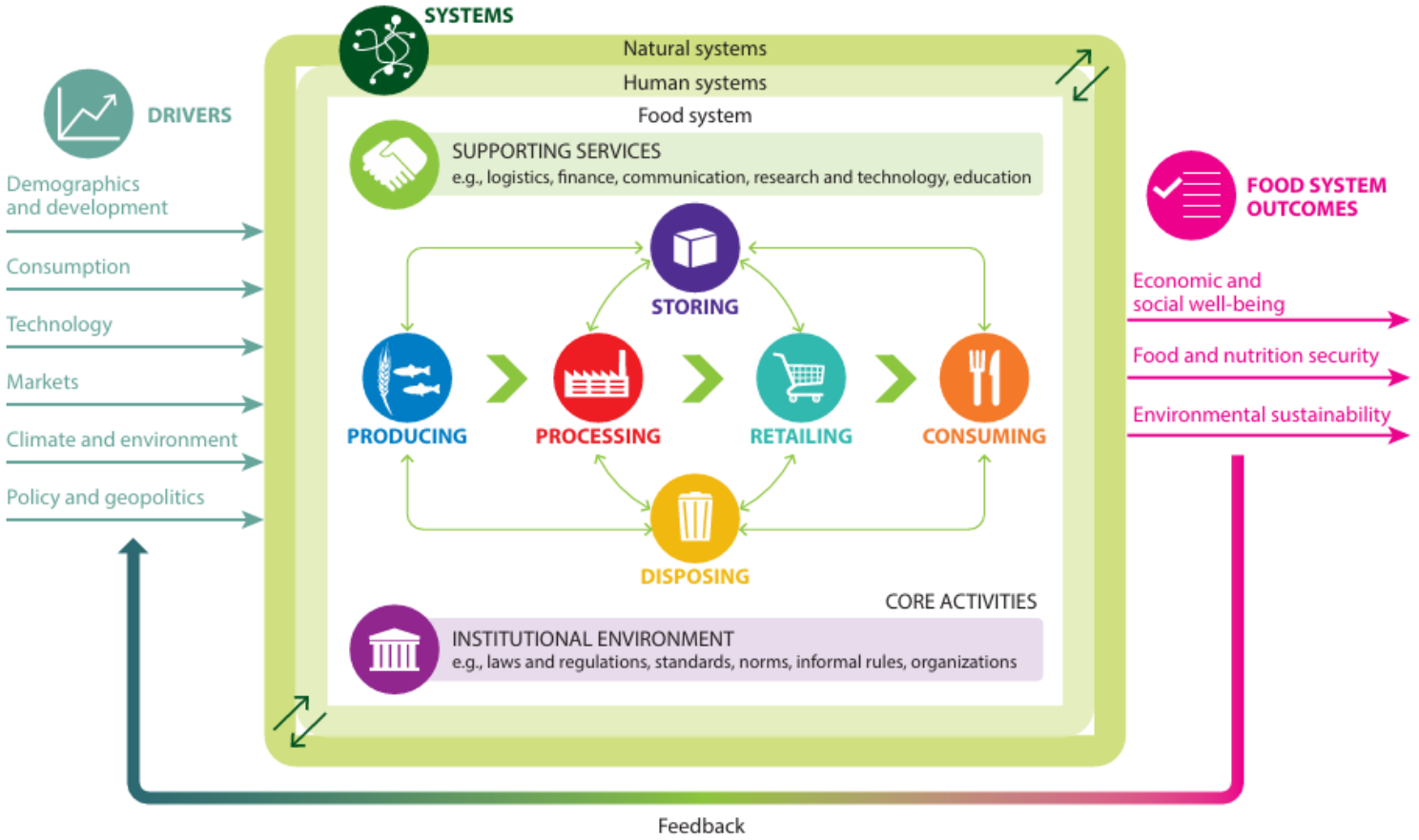
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Economic Commission for Africa

Objective

To produce, test, adapt and use an **integrated framework** that provides the principles and guidelines for **designing, supporting, and evaluating interventions** to enhance sustainability transitions and resilience of the **systems involving agro-processing Small and Medium Enterprises** (SMEs).

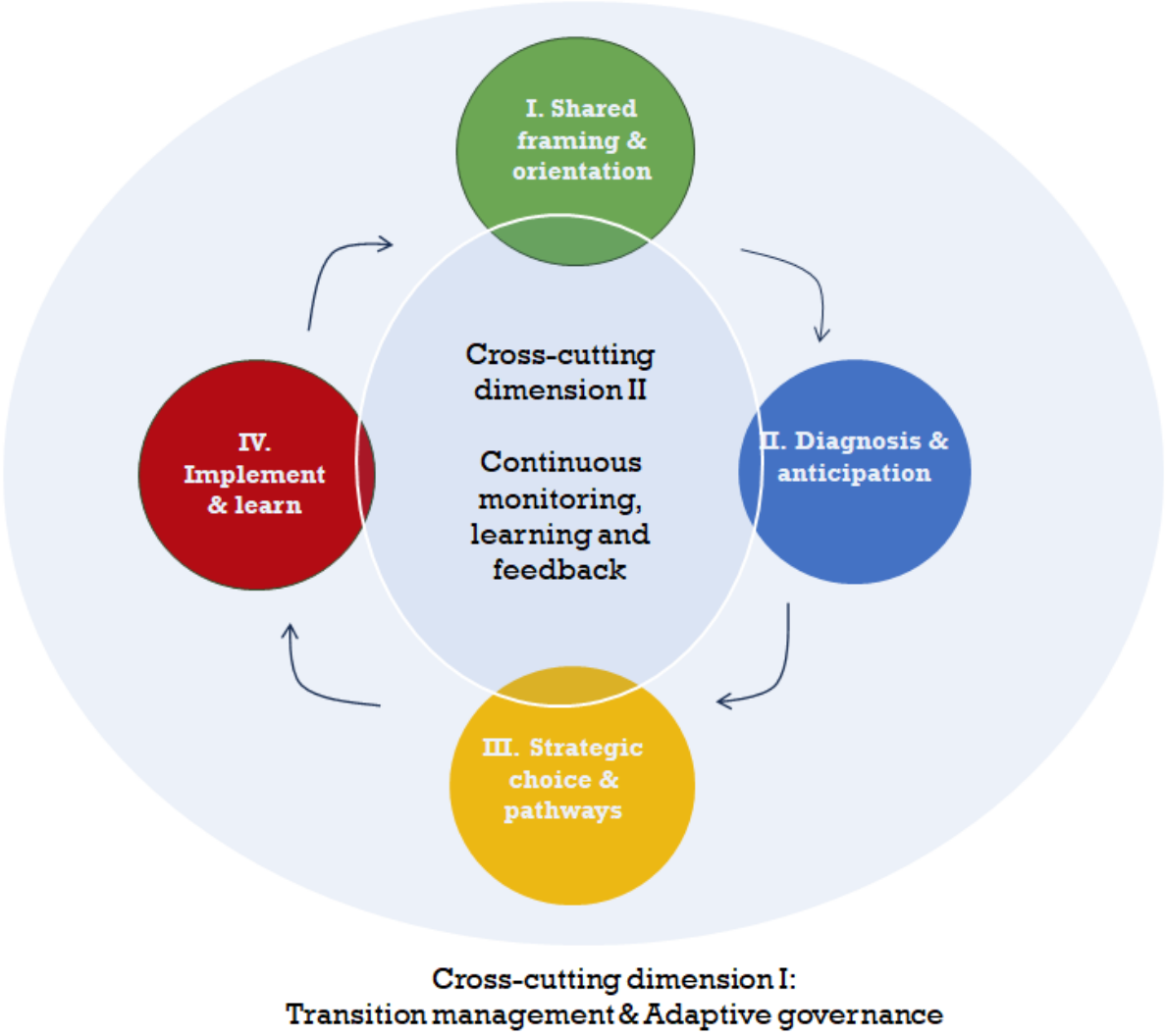
Background and key principles



Zurek, M., Ingram, J., Sanderson Bellamy, A., Goold, C., Lyon, C., Alexander, P., ... & Withers, P. J. (2022). **Food system resilience: concepts, issues, and challenges.** *Annual Review of Environment and Resources*, 47(1), 511-534.

- The **polycrisis** is triggering or will soon trigger change in agri-food SMEs;
- **Food systems** involve multiple interdependent, cross-scale dynamics;
- Need a shared **value regime** around resilience, justice and sustainability.
- Need of **polycentric governance**: no actor can lead this change alone.

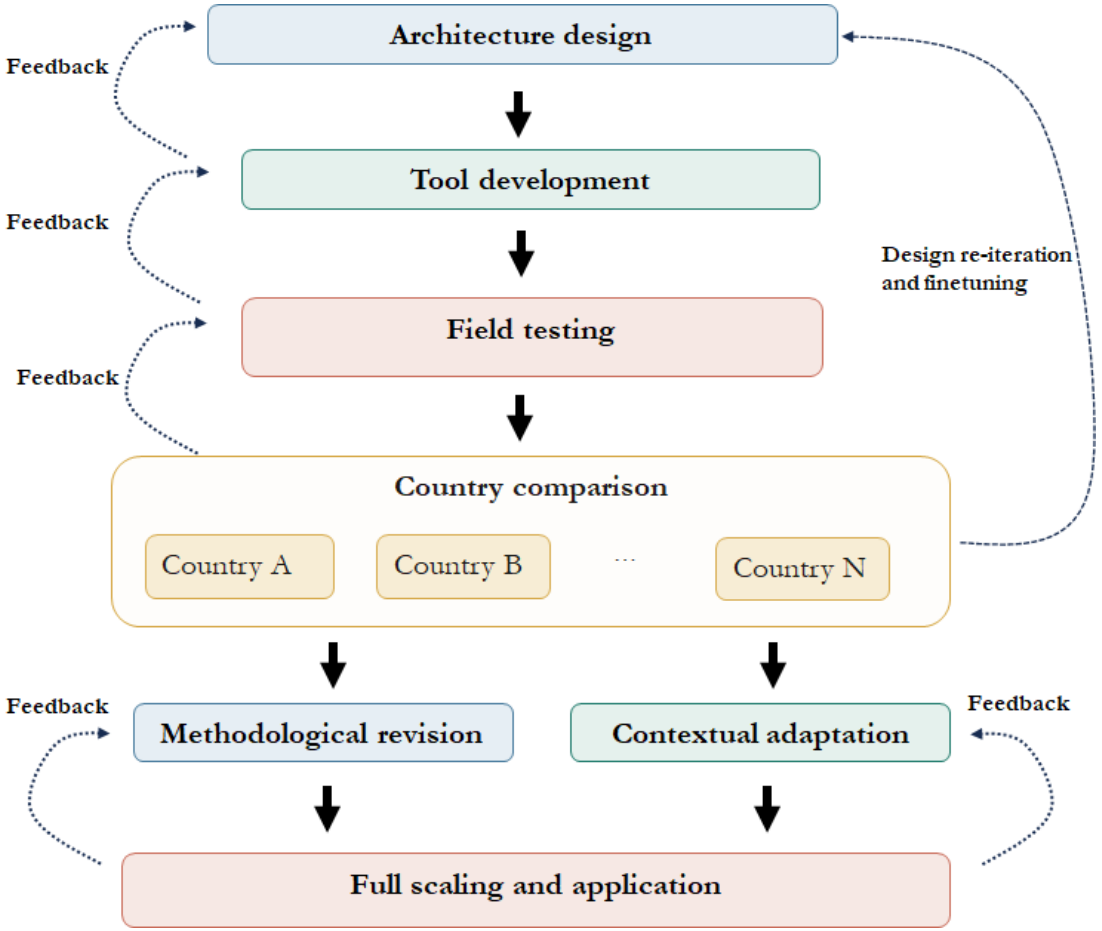
Integrated framework: Key phases



Source: Authors' elaboration.

- Phase I: Building shared **provisional** framing and orientation;
- Phase II: Diagnosis and anticipation of **social-ecological risks and impacts**;
- Phase III: Strategic choice **of interventions** and pathways **of change**;
- Phase IV: Implementation and learning **through distributed experimentation across scales.**

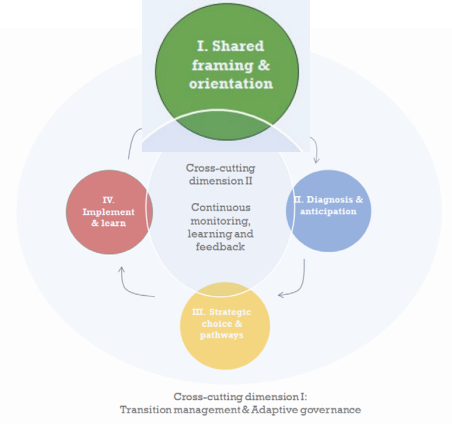
Iterative and adaptive process of design



Source: Authors' elaboration.

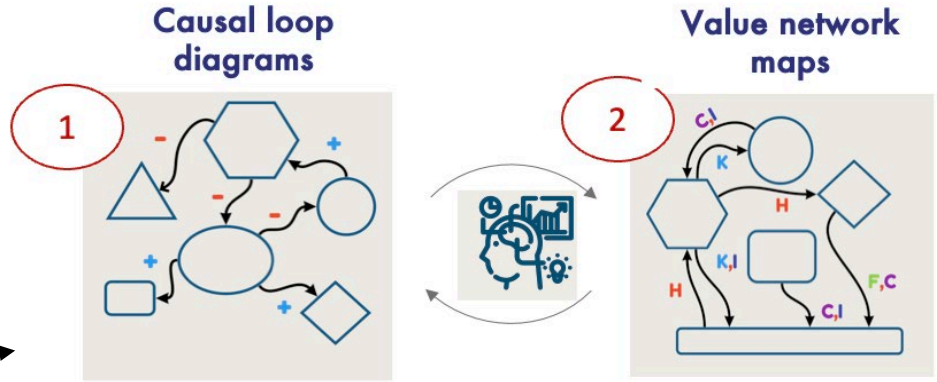
- The framework will be adapted over time through tool development and field testing in **Algeria, Senegal and Tunisia**;
- We are currently developing the **specific methodology** of each framework phase.

Phase I. Shared framing and orientation

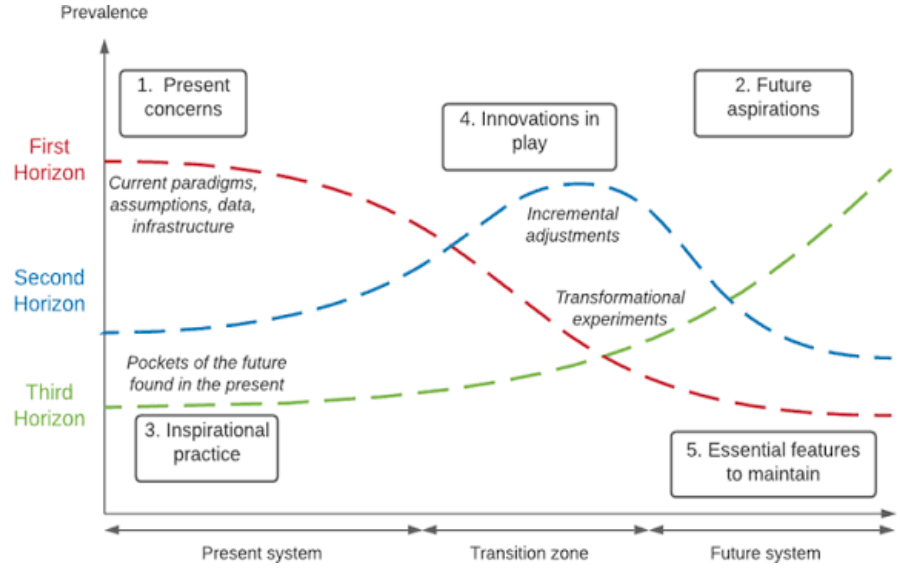


Four key steps:

- Coalition-building (pre-workshop);
- **Framing the boundaries of the system** (first workshop);
- Building a **shared provisional orientation** (second workshop);
- Reviewing the shared frames and orientation (post-workshop)

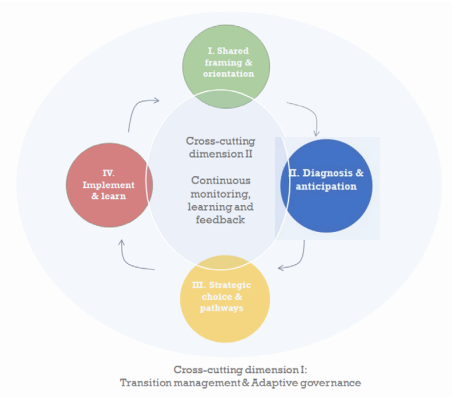


Dentoni, D., Cucchi, C., Roglic, M., Lubberink, R., Bender-Salazar, R., & Manyise, T. (2023). **Systems thinking, mapping and change in food and agriculture.** *Bio-Based and Applied Economics*, 11(4), 277.



Sharpe, B., Hodgson, A., Leicester, G., Lyon, A., & Fazey, I. (2016). **Three horizons: a pathways practice for transformation**. *Ecology and Society*, 21(2).

Phase II. Diagnosis and anticipation



Seven key steps:

- Identify climate shocks, stresses and pressures;
- Select **climate risk and impact indicators;**
- Construct narrative scenarios;
- Map impact channels;
- Agro-processing SMEs' **diagnosis of perceived vulnerability and thresholds;**
- Sectoral synthesis;
- Sectoral risk scenarios.

Example

TABLE A.1: Indicators of climate change risk to anticipate how climate change may impact social and economic variables at a national scale.

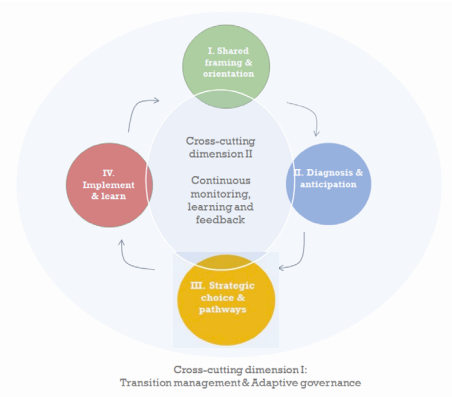
Category	Indicators	Sources
Climate change	- Mean annual temperature increase; - Extreme heat days per year; - Annual precipitation anomaly.	- World Bank CCKP (2025); - World Bank CCKP (2025); - CHIRPS (2026)
Freshwater change	- Groundwater depletion rate; - Salt-affected soils; - Per capita renewable freshwater availability; - Flood risk index.	- NASA GRACE (2025); - FAO AQUASTAT (2024); - FAO AQUASTAT (2024); - FAO (2025)
Land-system change	- Vegetation productivity index; - Share of ag land affected by severe degradation; - Tree cover loss due to fires;	- NASA LAADS DAAC (2026); - UNCCD (2022); - Global Nature Watch (2026)
Ocean acidification	- Sea surface pH; - Seagrass & shellfish habitat extent; - Fishery stock viability & species composition shift.	- Copernicus Marine Service (2024); - OBIS (2026); - FAO Fishstat (2024), Areas 34 and 37

TABLE A.2: Indicators of climate change impact to assess how climate change has impacted and is impacting social and economic variables at a national scale.

Category	Indicators	Sources
Climate change	- National climate vulnerability index; - Changes in labor productivity; - Increased energy demand attributable to climate change.	- ND GAIN (2025); - Diallo and Ondoa (2025); - Van Ruijven et al. (2019); Parkes et al. (2019)
Freshwater change	- Surface water storage in dams & reservoirs; - Agricultural water deficit and irrigation shortfall; -Diarrheal Disease Incidence Rate	- Tramblay et al. (2017); - Venema et al. (1997); - WHO (2022); Thiam et al (2017)
Land-system change	- Climate-driven ag productivity change; - Agricultural harvest change; - Arable area change.	- Yilmaz et al. (2025); - Wang et al. (2026); - World Bank (2023).
Ocean acidification	- Fisheries and aquaculture revenue loss (GDP %); - Coastal and Marine Tourism Revenue Loss (GDP %) - Seafood import dependency ratio	- Rodrigues et al. (2013); - Hassoun et al. (2022); - OECD (2025)

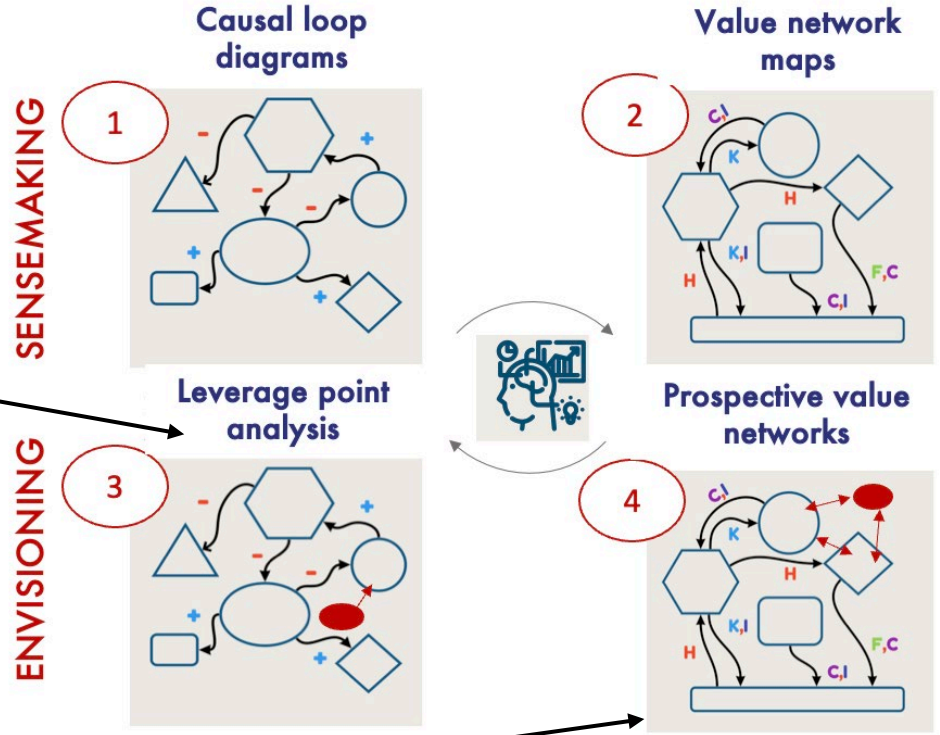
Source: Authors' elaboration.

Phase III. Strategic choice and pathways



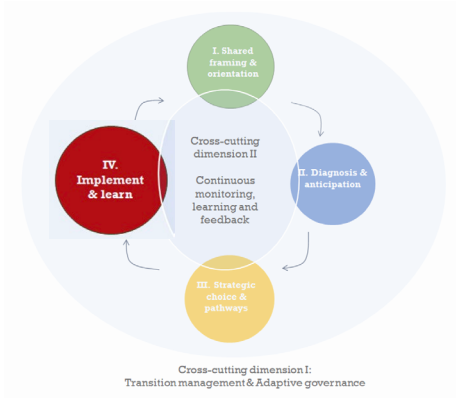
Outcomes (to be yet sequenced):

- Consolidating the value regimes for just transitions;
- Defining alternative transition pathways;
- Portfolio of strategic options;
- Anticipating adaptive pathways;
- Defining the governance of the just transition.



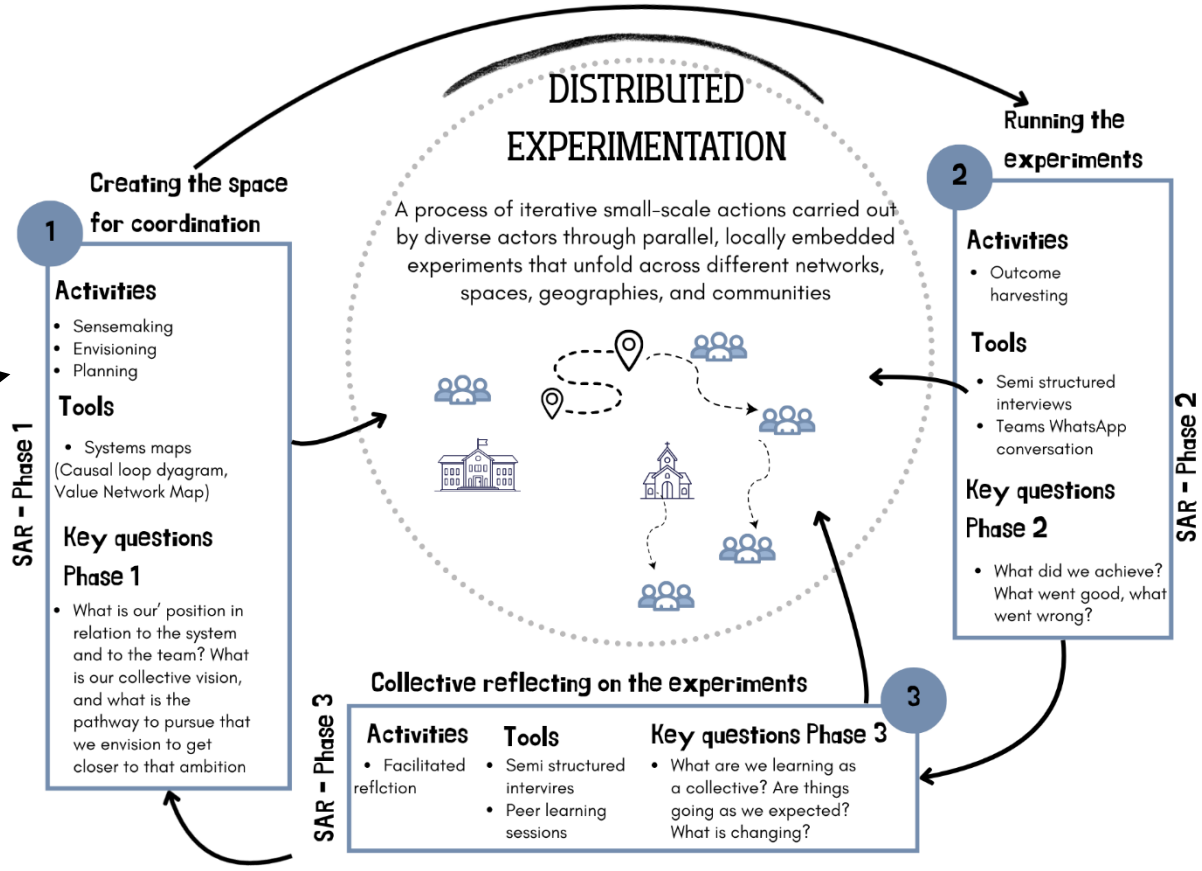
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Phase IV. Implementation and learning



Outcomes (to be yet sequenced):

- Distributed experimentation of strategic pathways;
- Learning from the distributed experiments;
- Institutionalization and scaling of the transition.



Cucchi, C., Dentoni, D., Namugumya, B.S., Brouwer, H. (2027). **Orienting Distributed Experimentation for Sustainability through Systemic Action Research.** *Global Challenges*, forthcoming.

Discussion

This **framework, methodology and field practice** enhancing sustainability transitions and resilience of the agro-processing SME systems helps **tackling unresolved research questions** in the literature:

- How to build a **cohesive coalition** with shared frames and orientation of a topic of existential importance for the actors involved?
- How to maintain **justice, resilience and sustainability** at the core of the value regime throughout the entire process?
- How to swiftly move the coalition **from dialogue to action**, from action to learning, and from learning to adaptation and scaling?

Thank you. Questions welcome!





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