# The role of agricultural risk management in strengthening farming systems' resilience:

# Results from a multi-scale co-creation approach

SUSTAINABLE RESILIENT EU FARMING SYSTEMS

SURE Farm

EAAE

**Sustainable and resilient farming systems in the European Union**

**The 173rd EAAE Seminar of the European Association of Agricultural Economists (EAAE)**


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POLITÉCNICA

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# Introduction

- The agricultural sector faces a broad array of environmental, economic, social and institutional challenges.
- The ability of farming systems to cope with these challenges can be addressed with the concept of resilience.
- Resilience assessment allows to address the ability of farming systems to cope with these challenges ensuring the provision of the essential functions.
- Effective risk management strategies support farmers' decisions (Chuku and Okoye, 2009;OECD, 2018) and make their system more resilient (Dahms, 2010; Mitchell and Harris, 2012; Mitchell and Harris, 2012; Shiferaw et al., 2014).

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# The research question:

## To what extent and how risk management strategies contribute to resilience capacities?

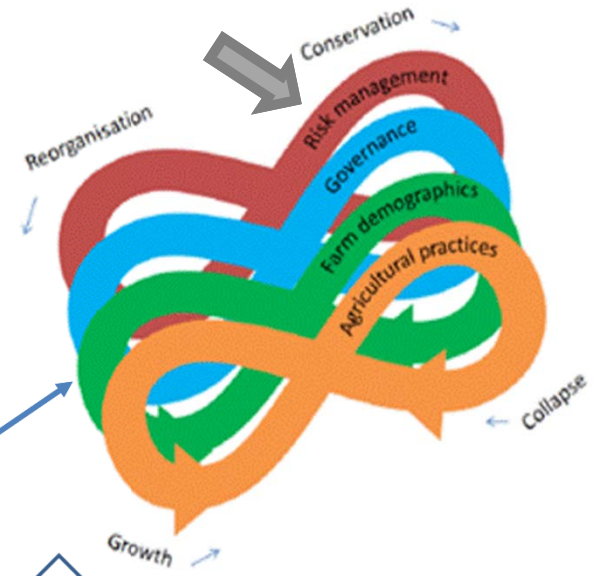
Farming System Resilience Framework

1. Resilience *of what*?
2. Resilience *to what*?
3. Resilience *for what purpose*?
4. What *resilience capacities?*
5. *What enhances* resilience?

| | |
|---|---|
| **Farming system** | Farms<br>Other actors<br>Locality |
| **Challenges** | Environmental<br>Economic<br>Social<br>Institutional |
| **Functions** | Private goods<br>Public goods |
| **Resilience capacities** | Robustness<br>Adaptability<br>Transformability |
| **Resilience attributes** | Diversity<br>Openness<br>Tightness of feedbacks<br>System reserves<br>Modularity |

Specified resilience

General resilience

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## The specific objectives are :

- Asses the stakeholders' perceptions about the agricultural challenges.
- Analyze the strategies identified by stakeholders to deal with the agricultural challenges.
- Explore the contribution of risk management strategies to the resilience capacities of the farming systems.


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# The methodology:
# Multi-stakeholders and multi-level approach

| | Multi-stakeholder approach at two geographical levels | | | |
|---|---|---|---|---|
| | European level | | Farming System level | |
| | Digital co-creation platform (Multi-stakeholder) | | Multi-stakeholder Focus groups | |
| **Specific objectives** | **no. participants** | **Period** | **no. participants** | **Period** |
| 1. Prioritise agricultural challenges | 26 | 11/09/18 - 5/05/19 | 8 | 04/04/2019 |
| 2. Strategies to deal with challenges | 11 | 26/11/18 - 5/05/19 | 8 | 04/04/2019 |
| 3. Strategies by actor to deal with challenges | 11 | 26/11/18-5/05/29 | 8 | 04/04/2019 |
| 4. Contribution of the actors involved in RM strategies to resilience capacities | NA | NA | 8 | 04/04/2019 |

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# The methodology: The inductive analysis to address risk management contribution to farming system resilience capacities.

- Inductive analysis is appropriate when prior knowledge regarding the phenomenon under investigation is limited (Elo and Kyngäs 2008; Onwuegbuzie et al., (2009).
- Procedure:
  - Code all the roles performed by actors in risk management strategies
  - Group the coded roles according to the resilience capacity they may contribute, following an interactive process:
    - Three parallel assessments are performed by three researchers to classify the roles according to the resilience capacities.
    - The individual assessments are shared, reviewed and agreed upon by the three researchers;
    - Codes by classification are counted and plotted.

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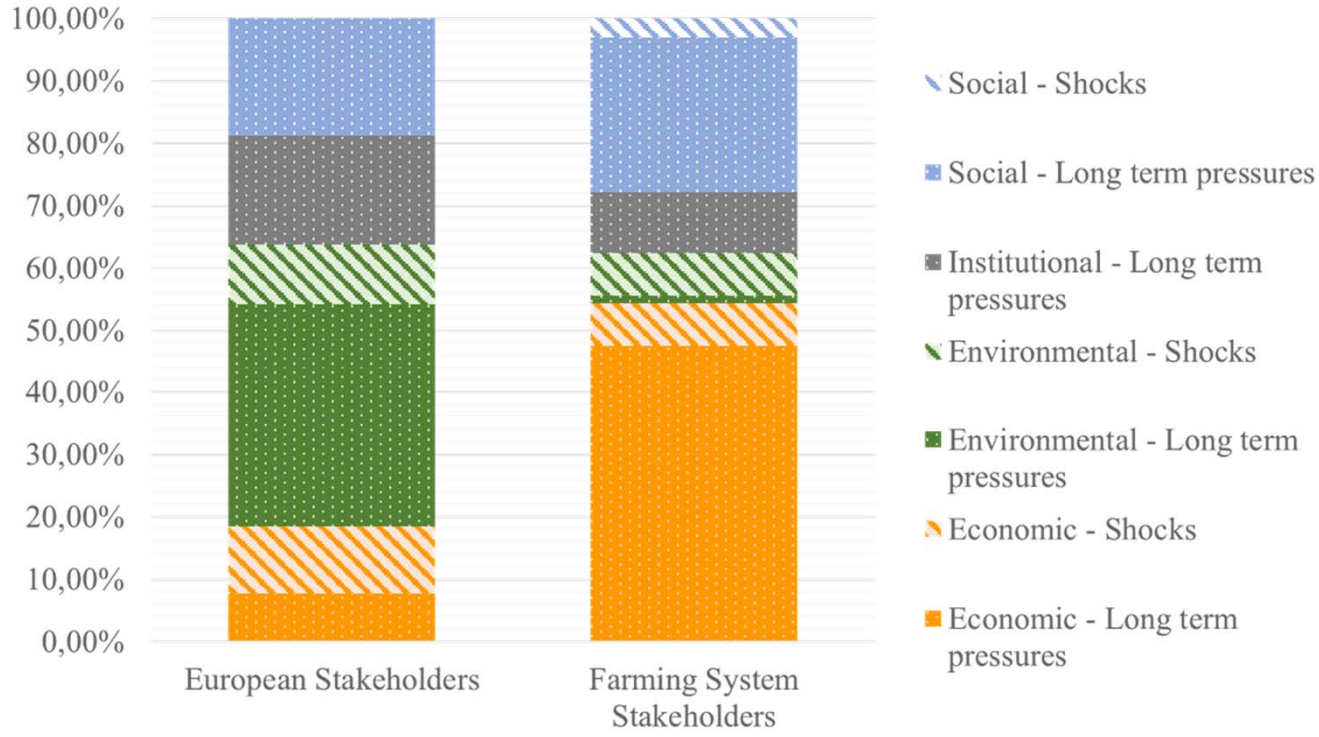
# The results: Agricultural challenges perceived by stakeholders




- The figure shows the relative position of each category of challenges regarding the number of challenges mentioned by the stakeholders.
- **260** challenges mentioned by the European stakeholders. Source of data: 26 stakeholders participating in the virtual co-creation platform.
- **162** challenges mentioned by the farming systems' stakeholder. Source of data: 60 surveys results agreed and supplemented by the stakeholders focus group.

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# The results: Agricultural challenges perceived by stakeholders

| | | European Stakeholders | Farming System Stakeholders |
|---|---|---|---|
| **Environmental** | Shock | **Greater occurrence of extreme events**// Animal and plant diseases | **Wild Fauna**// Droughts. |
| | Long term pressure | **Global warming**// **Water scarcity**// **Change in precipitation patterns**// **Decline of pollinators**// **Water pollution**// Reduced soil fertility (soil mining, depletion of soils nutrients)// Nitrogen emissions// Sea level rise// Altered phosphorous cycle// Soil Pollution by heavy metals// Species extinction// Antimicrobial resistance// Loss or impairment of habitats. | Environment conservation. |
| **Economic** | Shock | **Price volatility in agricultural markets// Farmer's income volatility**// Lower agricultural yield | **Low prices**// Increasing costs. |
| | Long term pressure | Upstream and downstream market power along the value chain// Increased cost of hired labour// New competitors in internationalized and liberalized markets, competition on and reallocation of resources// Reduced access to bank loans or other sources of finance// Price of agricultural land// High (start-up) costs// Farms' taxation | **Lowering profits**// **Dificulties to increase production and improve the business**// New technologies implementation// Improve quality product// Increasing land prices// Low bargaining power of farmers |
| **Institutional** | Shock | | |
| | Long term pressure | **Changes in government support for agriculture**// Changing policy objectives and administrative demand// Trade and WTO reforms// Other countries agricultural policies (e.g. American Farm Bill, ASEAN policies, BRICS policies)// Restrictive standards (e.g. GM-free standards and regulations)// Intellectual property ('biopatents')// Changes in food safety regulations// Changes in regulations in destination markets (non-tariff barriers)// Changes in production control policies (quota)// Changes in land tenure regulations. | **Changes in government support for agriculture** (**CAP payments reduction)**// **Increasing bureaucratic//** Increasing controls, eligible hectares for receiving payments. |
| **Social** | Shock | | Unexpected retirement. |
| | Long term pressure | **Ageing of rural areas (lack of generational renewal)**// Changing societal concerns about agriculture (safety, animal welfare, resource utilization)// Population growth// Demographic change (increasing urbanization, rural outmigration, migration)// Changing attitude towards farm employability (succession, hired labour, part-time farming)// Remoteness, reduced access to social services (housing, education, health), less developed infrastructure (transportation, ICT)// Lack of consumer confidence// Gender gap// Reduced access to extension or advisory services & skills training// Wars and conflicts. | **Meat consumption reduction**// **Life quality**// **Limited availability of skilled farm workers**// Low labour force optimization// Bad press of the livestock sector// Time-consuming activities// rural areas depopulation. |

*) In bold: 10 most cited challenges at each level of study

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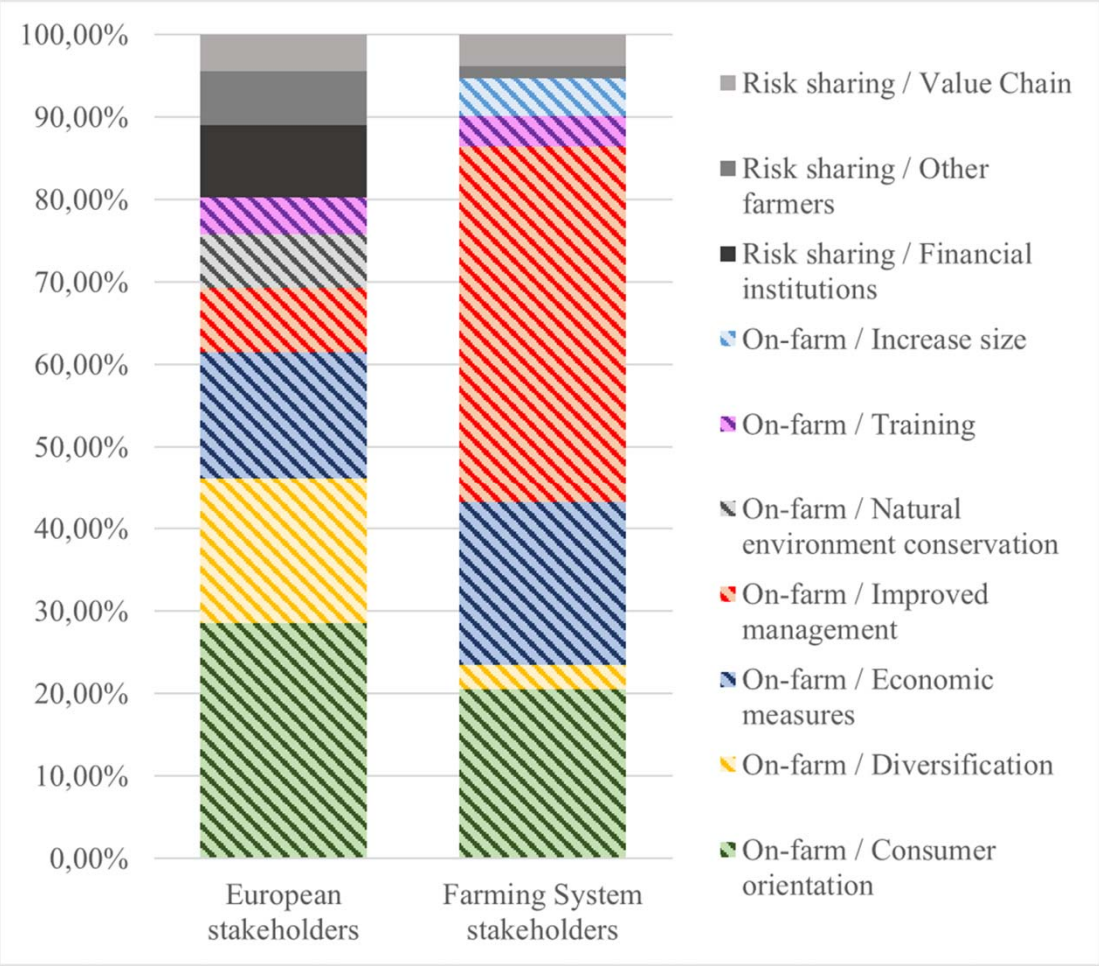
# The results: Strategies to deal with agricultural challenges identified by stakeholders.




- The figure shows relative position of each RM strategy categorization regarding the total number of RM strategies mentioned by the stakeholders.
- **69** strategies mentioned by European stakeholders. Source of data: 11 stakeholders participating in the virtual co-creation platform.
- **132** strategies mentioned by farming system stakeholders. Source of data: 60 surveys results agreed and supplemented by the stakeholders focus group.

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# The results: Strategies to deal with agricultural challenges identified by stakeholders.

| | | European Stakeholders | FS Stakeholders |
|---|---|---|---|
| Risk-sharing | Value chain | Contractualization// Short channels// Direct sales | Reduce sales intermediaries// Local sales// Direct sales |
| | Farmers | **Member of farmer´s organizations.** Mutual help among neighboring farmers// Knowledge sharing between producers | Member of a producer organization// Member of an (inter)branch organization |
| | Financial institutions | **Agricultural Insurance Contracts** | |

| | | European Stakeholders | FS Stakeholders |
|---|---|---|---|
| On-farm | Increase size | | **Increase production** |
| | Training | Advice services// Farmer's training courses, improved knowledge | **Farmers' training courses to improve knowledge** |
| | Preservation of the natural environment | **Optimization of natural resources inputs (water and soil)// Change to organic/sustainable farming**// **Improve irrigation management**// Promote Agroforestry// Use of renewable energies | |
| | Improve farm management | **Make the sector more attractive for new entrants** Adapted plant varieties// Improve the usage of chemical inputs (pesticides, fertilizers)// Design emergency response plans// Improve farming and tillage management// Improve transparency// Enhance local crops and breeds// Facilitae non-familiar heritage// Improve storage and processing management// Design program supply.Invest in new technologies (smart use data, tunnels and glass houses,vertical farming, digitalization) | **Improving feed and aninmal handling systems**// **Invest in new techologies (feeding, prolificacy, fencing, digitalization). Improve farm labour productivity**// Implemented measures to prevent pests or diseases// Reduce labour time demanding. |
| | Economic measures | **Saving accounts**// Achieve more institutional support// Make provisions// Reducing fix costs | **Achieve more institutional support**// **Costs optimization**// Increase profitability// Reducing level of indebtedness. |
| | Diversification (crop// business) | **Business diversification**// **Crop diversification**// Opening farms to the public. | Rural tourism// crop and livestock diversification// quality products diversification |
| | Consumer orientation | **Promote links with consumers//** production towards consumer needs// actions to reduce the gap between farmers and consumers | **High-quality breeds**// **To increase product quality// Find new market niches**// Rise market prices// Find new trade channels// eonsumption promotion, raise public awareness// provide information to reduce negative image of livestock farming// |

**Bold letters** indicate the 10 most cited strategies at each level of study.

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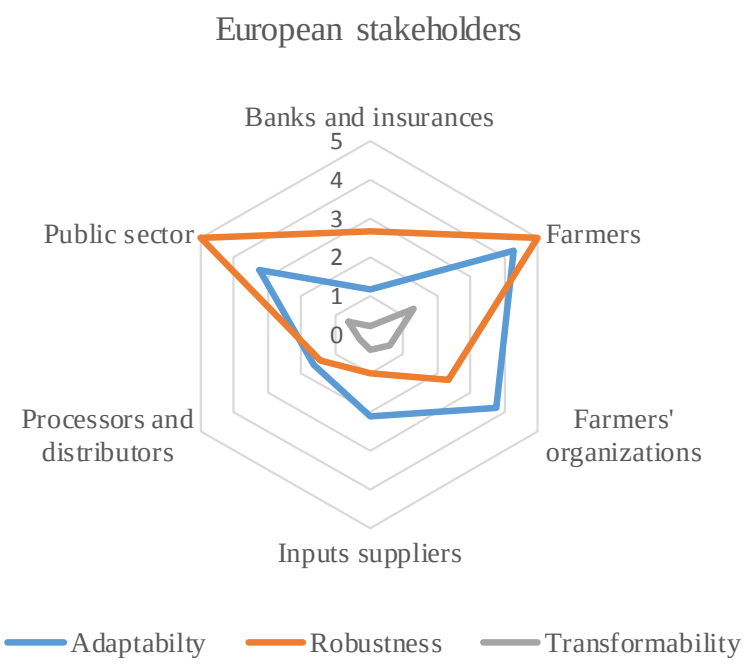
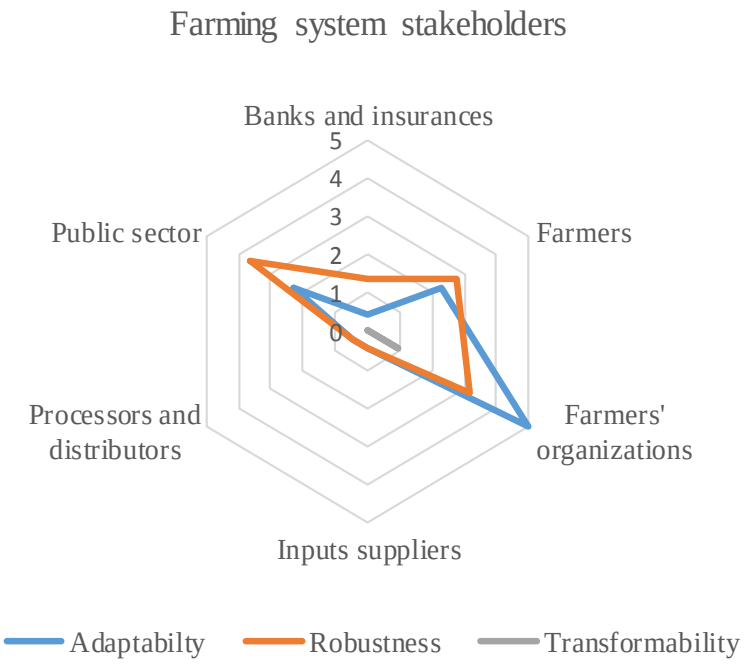
# The results: Risk management actor's contribution to resilience capacitites




- The figures show the number of times the stakeholders mention the roles of different actors classified according to resilience capacities. Results have been standardized to a 0-5 scale.
- **395** ideas mentioned by European stakeholders about the roles of the risk management actors. Source of data: 11 stakeholders participating on the virtual co-creation platform.
- **48** ideas mentioned by CS about the roles of the risk management actors. Source: 8 stakeholders participating in the focus group.

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# The results: Risk management actor's contribution to resilience capacitites

| Risk management actors | Actor's roles contributing to robustness | Actor's roles contributing to Adaptability | Actor's roles contributing to Transformability |
|---|---|---|---|
| Farmers | Preventive actions and planification; Cooperation with other actors; reducing costs; keeping savings; contracting insurance products; Improve farm management; searching advice services; developing local actions; Be aware and communicate agricultural value added; Information; Investment/ financing decision. | Training; Good practices Knowledge exchange; Local actions; Investment/ financing decision; environmental measures; Improve farm management; Information; Research and innovation; Consumer orientation Advisory; public awareness; Be aware and communicate agricultural value added; | Investment/ financing decision; Environmental protection measures; Business diversification; Research and innovation |
| Farmers' organizations | Advisory; Negotiate contracts with insurance companies; Negotiate contracts with processors; Define preventive actions; provide information; Enhance transparency; Boost value chain cooperation; search public -private collaboration; | Enhance good practices; Promote knowledge exchange; public awareness; lobby; Boost value chain cooperation; Open new market channels; support local actions; promote consumer orientation; Training; Research and innovation. | Research and innovation |
| Financial institutions | Providing financing products; insurance products; reinsurance products; collateral products; Public - private collaboration insurance; Transparency. | Training; Investment products; Research and innovation; Good practices. | |

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# The results: Risk management actor's contribution to resilience capacitites

| Risk management actors | Actor's roles contributing to robustness | Actor's roles contributing to Adaptability | Actor's roles contributing to Transformability |
|---|---|---|---|
| Processors/ Distributors | Transparency; Preventive actions; Research and innovation; Reduce costs; Value chain cooperation; Contracts with processors. | Knowledge exchange; Value chain cooperation; Research and innovation; Training; Good practices; New market channels; | Research and innovation |
| Inputs suppliers | Reduce costs; Contracts with processors; Transparency Value chain cooperation | Research and innovation; Knowledge exchange; Good practices; Value chain cooperation; consumer orientation; Influence environmental measures. | Research and innovation |
| Public sector | Public -private collaboration to support investments/financing; Public -private collaboration to support insurance; Tax measures; Market intervention; Transparency; Adequate subsidies; Preventive actions; Public - private collaboration to support cooperatives/associations and value chain cooperation; Advisory; Adequate bureaucracy. | Sensibilization; Public - private collaboration investments/financing; Research and innovation; Good practices; Value chain cooperation; labour market incentives; Local actions; Public awareness; Public-private collaboration; Support environmental practices; support short channels; Training; Investment | Public -private collaboration investments/financing; Research and innovation; |

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# Conclusions

- The two-scale assessment shows the different stakeholders perceptions about the agricultural challenges and the strategies to deal with them. Different risk and strategies perceptions from agricultural sector stakeholders need to be considered when policies and instruments to support farming systems are defined.
- The need of an holistic risk management perspective, considering the participation of every actor in the sector and its dynamics, beyond the farmers.
- Different actors contribute to different resilience through a different manner.
- Farmers, supported by public administration and farmers' organizations, are the actors with more potential to contribute to farming system's robustness and adaptability through the implementation of on-farm strategies.

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# Conclusions

- Financial institutions and value-chain agents presently contribute less to farming systems resilience capacities. There is a room to boost new risk-sharing strategies to reinforce the farming system resilience.
- It appears also that all actors could also be more open to enhance the transformability capacity of the farming system.

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## Shortcomings

- The diversity of roles of the farming systems actors classified according to resilience capacities needs to be carefully address as a proxy of the contribution of the farming systems actors to resilience. This work serves as a base line to bring together a number of case study assessments that pursue in further analyses.
- Different multi-stakeholders approaches (digital- face to face) may bias the results.
- Finally, while subjectivity impregnates findings, participants were selected for being knowledgeable and relevant actors and iterative research has been performed.

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