

Farm resilience in Mediterranean agricultural territories: a multi-scale and multi-risk approach in France and Tunisia

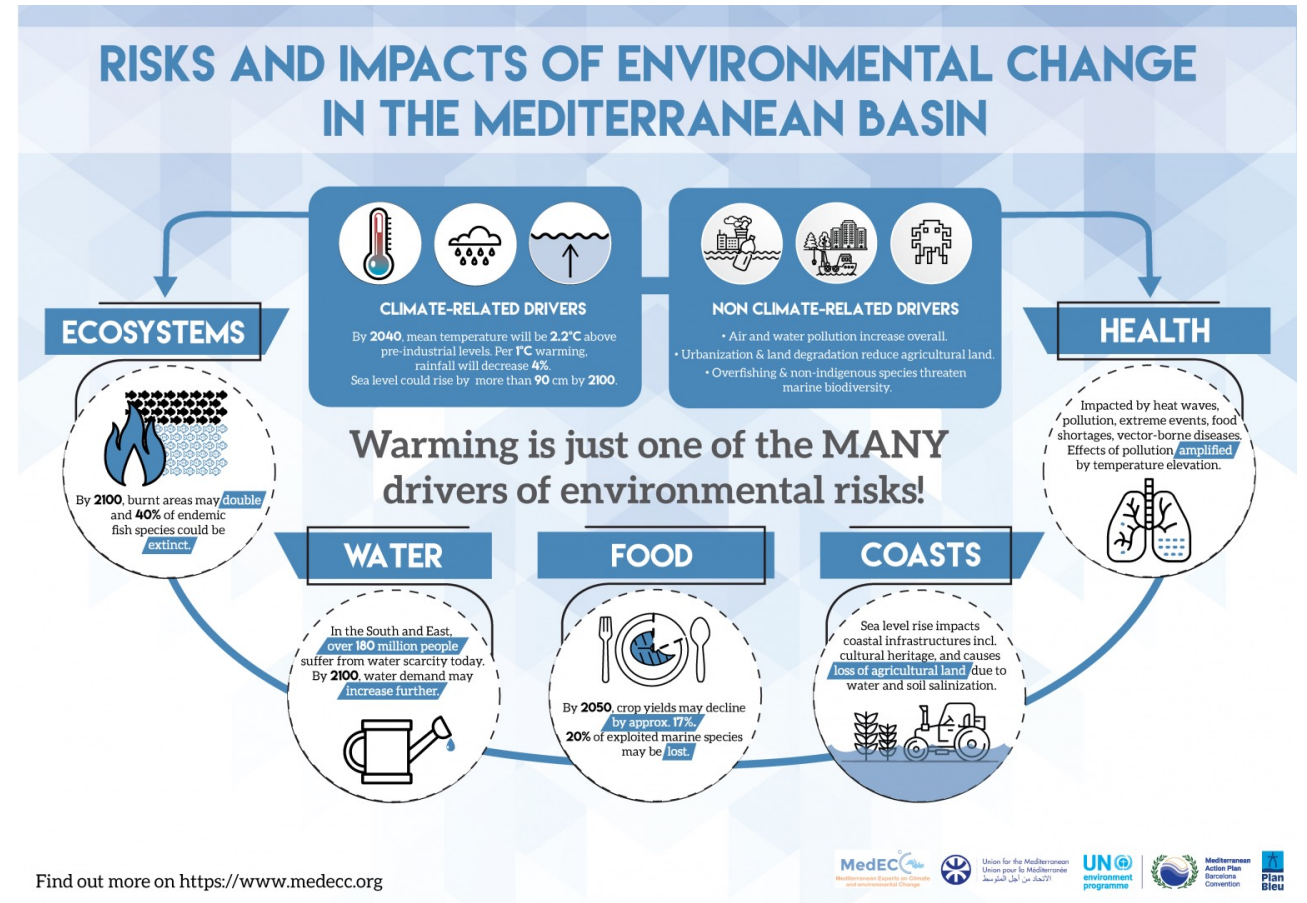
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A Mediterranean basin exposed to multiple risks

- Stresses AND shocks
 - Climatic
 - Economic
 - Sanitary
 - Etc.
 - Severe drought
 - Heat waves
 - Ukraine war : cereals and fertilizers prices
- Importance of farm resilience (Meuwissen et al., 2019)
 - Several frameworks
- Adaptation depending on different scales, in particular the territory
 - Natural resources management (individual, collective)
 - Inputs availability (seeds, equipment ...)
 - Knowledge circulation and extension services



(Source: MedECC, 2020)

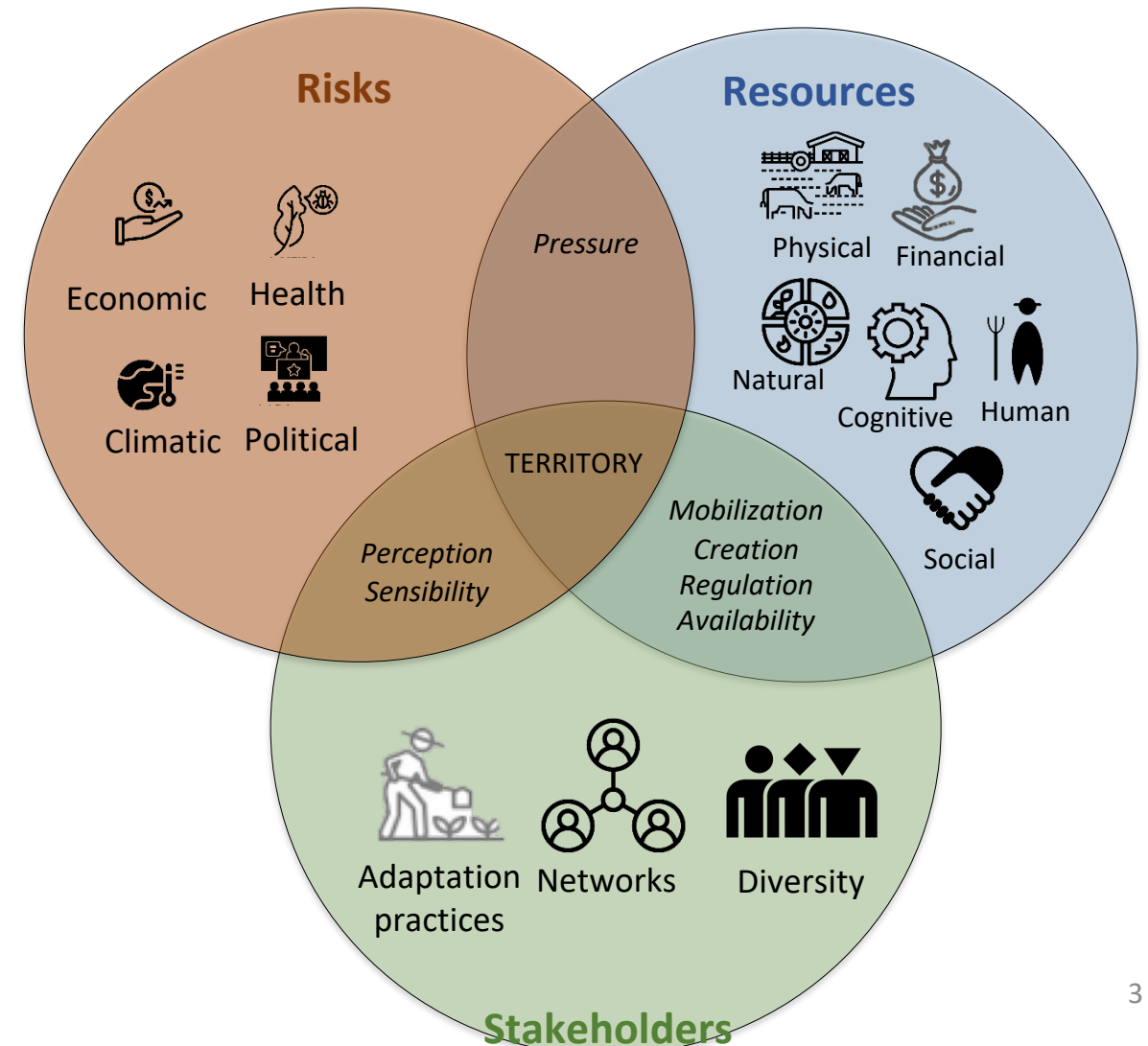
Objective : Develop an operational framework to assess the resilience of farming systems by hybridizing existing frameworks

Risks X **Resources** X **Stakeholders**

Considering :

- Risks: farmer's adaptation strategies in response to both perceived short- and long-term risks.
- Stakeholders: Farmers' practices AND capacities (van der Lee et al., 2022) AND social & physical Relations (Darnhofer et al., 2016)
- Ressources: all the ressources and their accessibility including social and cognitive ressources

=> territorial perspective



Two contrasted case studies

- Aude valley (South of France)

- Mediterranean climate (450-650 mm)
- 89,000 ha of cropland including 21% irrigated
- Specialized systems (grapevine, cereals, grassland, vegetable and fruits)
- Mean farm size of 35 ha

- Siliana (North Tunisia)

- Semi arid climate (300-500 mm annual)
- 8,500 ha of cropland including 15% irrigated
- Diversified systems (cereals, olive tree, breeding, vegetable)
- Mean farm size of 10 ha

Method in each site:

± 30 semi-directive interviews with farmers

Gather perceived risks

Document adaptation strategies

Identify what and how resources are mobilized or not

± 6 semi-directive interviews with others stakeholders

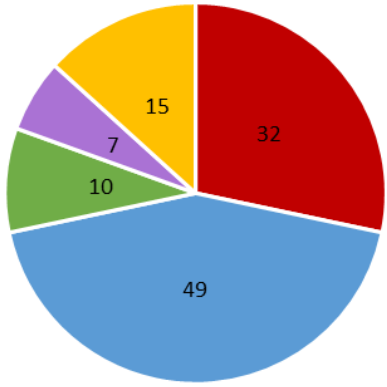
Identify their facilitating or hindering role

Analyses: co-citation of risks, adaptations' strategies & use of resources, focus on the social resources

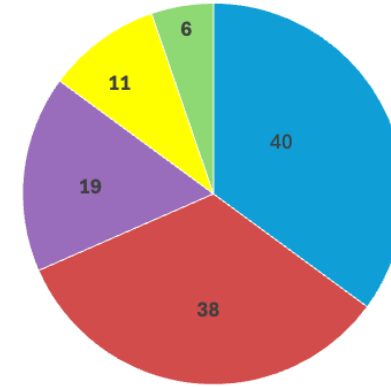
Key risks in the two study areas

Risks' categories:

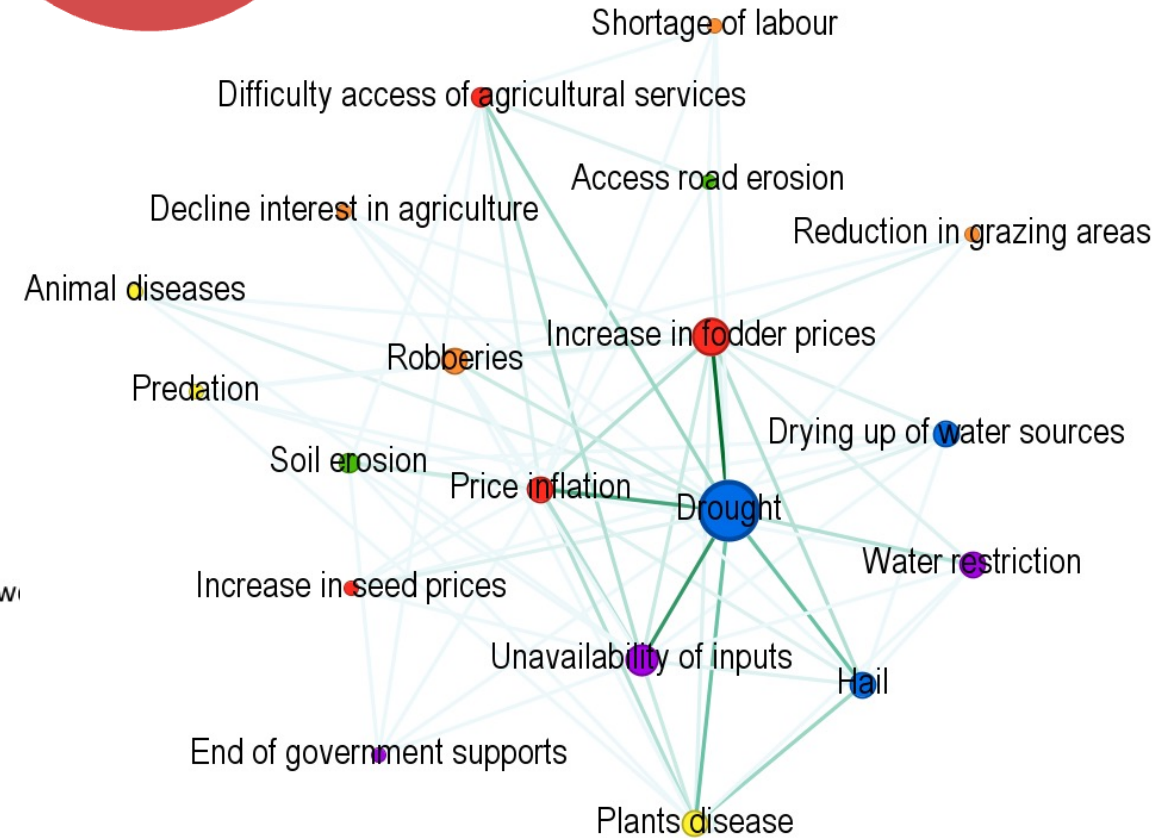
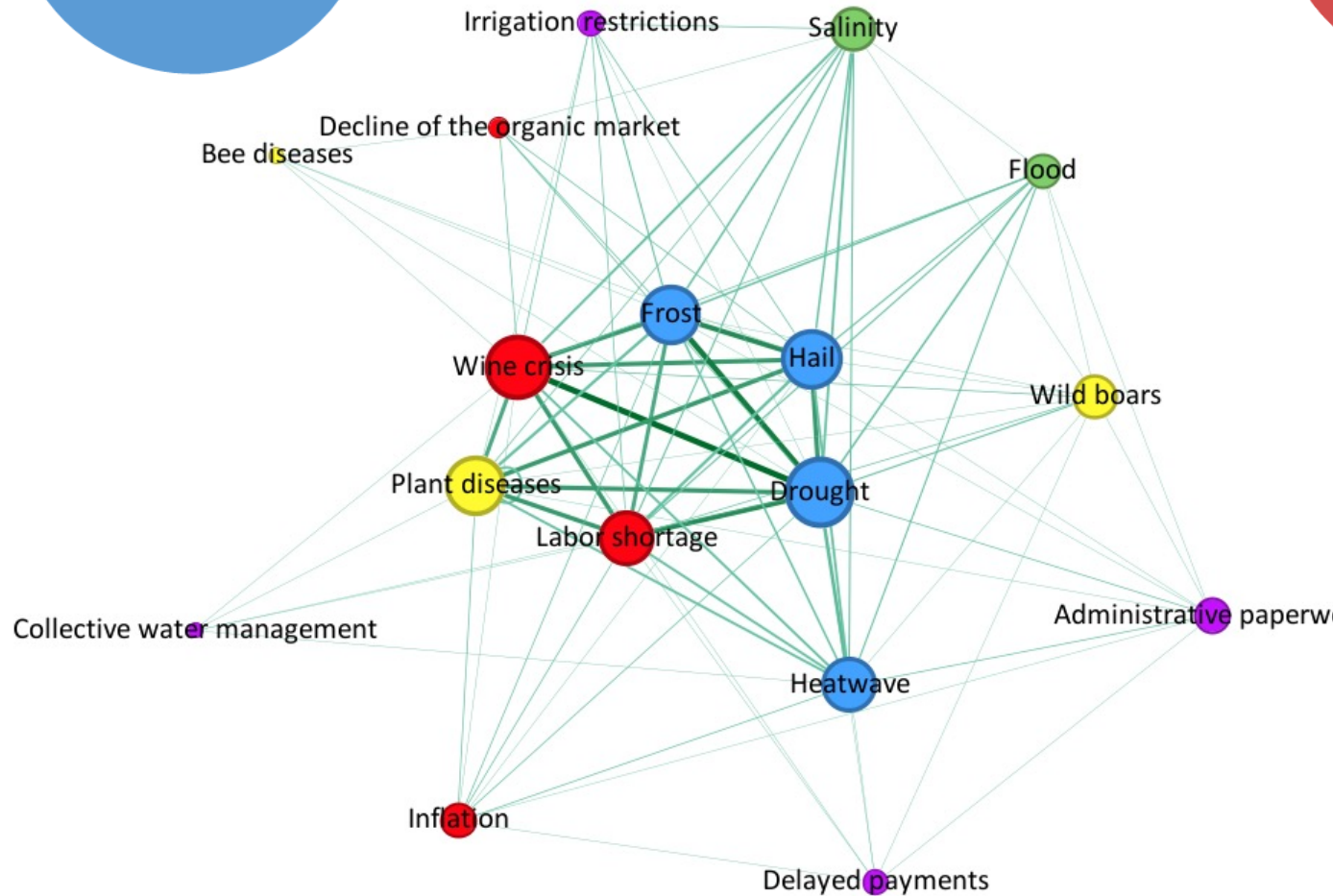
- Economical
- Climatic
- Natural
- Sanitary
- Institutional



Aude Valley



Siliana



Adaptation strategies in Aude valley to main risks

Main risks: Drought x Wine crisis

CLASS OF RESSOURCES		PHYSICAL	FINANCIAL	NATURAL	HUMAN	SOCIAL	COGNITIVE
		TYPE OF STRATEGIES (risks-specific/total)					
Robustness strategies	Anticipating and avoiding the impact of risk (n=4/20) <i>E.g. Take a climatic insurance</i>	0	0.8	0	0	0	0,3
	Maintaining an already adapted system (n=6/7) <i>E.g. Maintain polyculture</i>	0	0	0	1	0,3	0.7
Adaptive strategies	Improving production process (n=40/62) <i>E.g.. Mechanize a production step</i>	0.5	0,4	0,4	0.5	0,1	0,4
	Improving access to resources (n=13/26) <i>E.g. Get involved in agricultural networks</i>	0,3	0,2	0,2	0.8	0,4	0,2
Transformative strategies	Stop an activity (n=2/3) <i>E.g. Stop a crop</i>	0	0	0	0	1	0
	Diversify the system (n=4/6) <i>E.g. Diversify with perennial crops</i>	1	1	1	1	0	0

N = 10

N = 53

N = 6

Robustness strategies

Adaptive strategies

Transformative strategies

Adaptation strategies in Siliana to main risks

Main risks: Drought x Fodder crisis (price and shortage)

CLASS OF RESSOURCES		PHYSICAL	FINANCIAL	NATURAL	HUMAN	SOCIAL	COGNITIVE
		PHYSICAL	FINANCIAL	NATURAL	HUMAN	SOCIAL	COGNITIVE
TYPE OF STRATEGIES (risks-specific/total)							
Robustness strategies	Substitution of ressources (n=40/71) <i>E.g. Turn to external sources for fodder</i>	0,9	0,3	0,2	0,1	0,4	0
	Redundancy (n=3/4) <i>E.g. Store fodder in anticipation of a bad year</i>	1	1	0	0	0	0
	Modification of production's function (n=0/11)	/	/	/	/	/	/
Adaptive strategies	Improving production process (n=1/37)	0	0	1	0	1	0
	Tightening system (n=6/14) <i>E.g. Decrease herd size, Reduce family expenses</i>	0	0	0	0	0	0
Transformative strategies	Introduction of an activity (n=8/12) <i>E.g. Convert from dairy to beef production</i>	1	0,5		0,1	0,3	0,3
	Stop an activity (n=6/12) <i>E.g. Abandon livestock farming</i>	0	0	0	0	0	0

N = 43

N = 7

N = 14

Total Social resources and their role in strategies in face of combined main risks



Business relationships

Sales, customers and suppliers

⇒ Change in commercialization strategy

⇒ Short supply chain

R, A, T

Sales and suppliers

⇒ Selling milk for fodder

⇒ Granting of loan

R, T

Mutual assistance: neighborhood and groups

⇒ Installation of a collective irrigation network

⇒ Setting up a direct sales outlet

A

⇒ Sharing vehicles for long-distance fodder purchase

R

Mutual assistance: family

⇒ Informal short-term loan

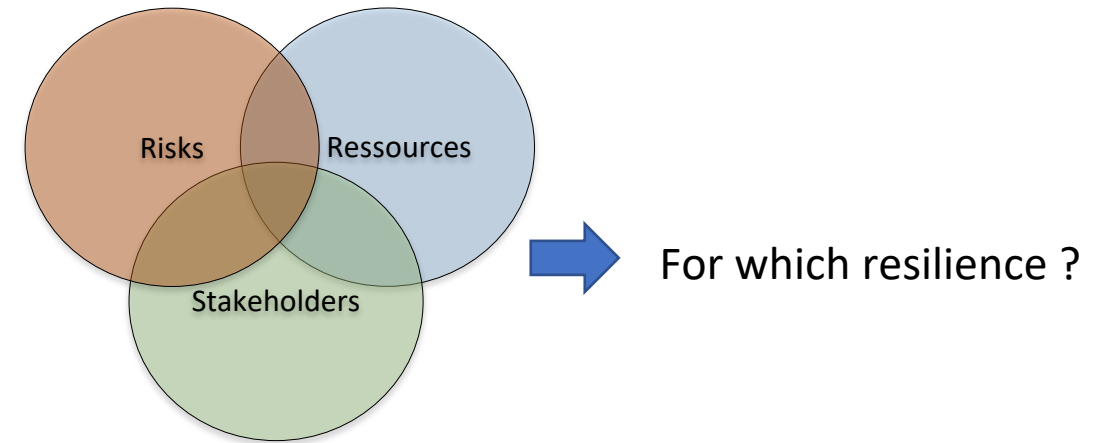
⇒ Access to key resources: water, land, and vehicles

R

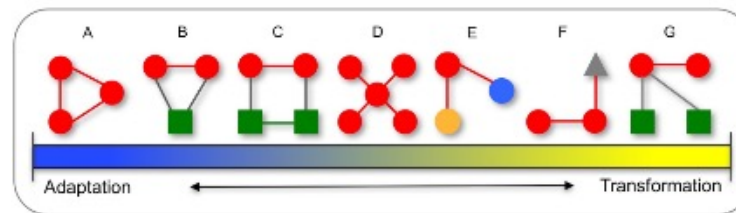
R: robustness, A: adaptation, T: transformation

Perspectives

- Assessment of the resilience outcomes



- Formalization of different networks configurations between actors, resources and institutions => more transformative strategies linked to more complex networks?



Barnes et al., 2017
Labeyrie et al., 2024

- From local case studies to Mediterranean basin resilience study ?