Session 7

Mixed crop/livestock systems – do they deliver more resilient food systems ?

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MIX-ENABLE

Reducing the vulnerability of mixed cattle-sheep farms

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CORE organic

With the financial contribution of

Definitions

- Vulnerability: significant risk of falling below a critical level *(Hoddinott and Quisumbing, 2010)*
- It results from :
  - Risk exposure: degree, duration, and/or extent in which the system is in contact with, or subject to, the perturbation *(Gallopın 2003),*
  - Sensitivity to risks: the degree to which the system is affected by these disturbances *(Adger, 2006; Kasperson et al., 2005)*

Which depends on

- Initial state of the farming system
- on ex-ante and ex-post risk management // adaptive capacity

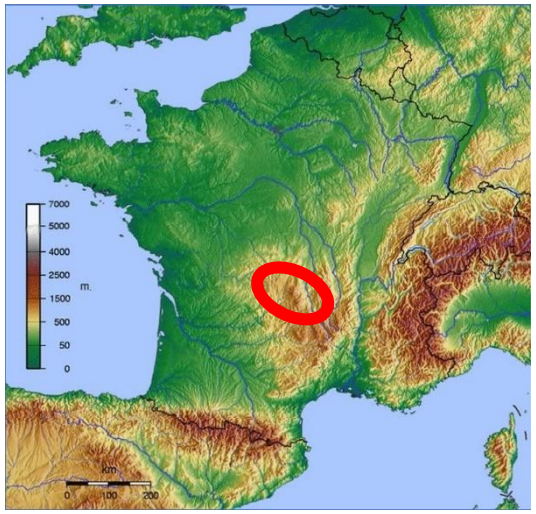
→Diversification of farming systems can reduce risk exposure & vulnerability (portfolio)

Objectives

- How organic cattle-sheep farmers of the French Massif Central feel expose to risks and how they manage them
- Assess the impacts of strategies to reduce their vulnerability

Method

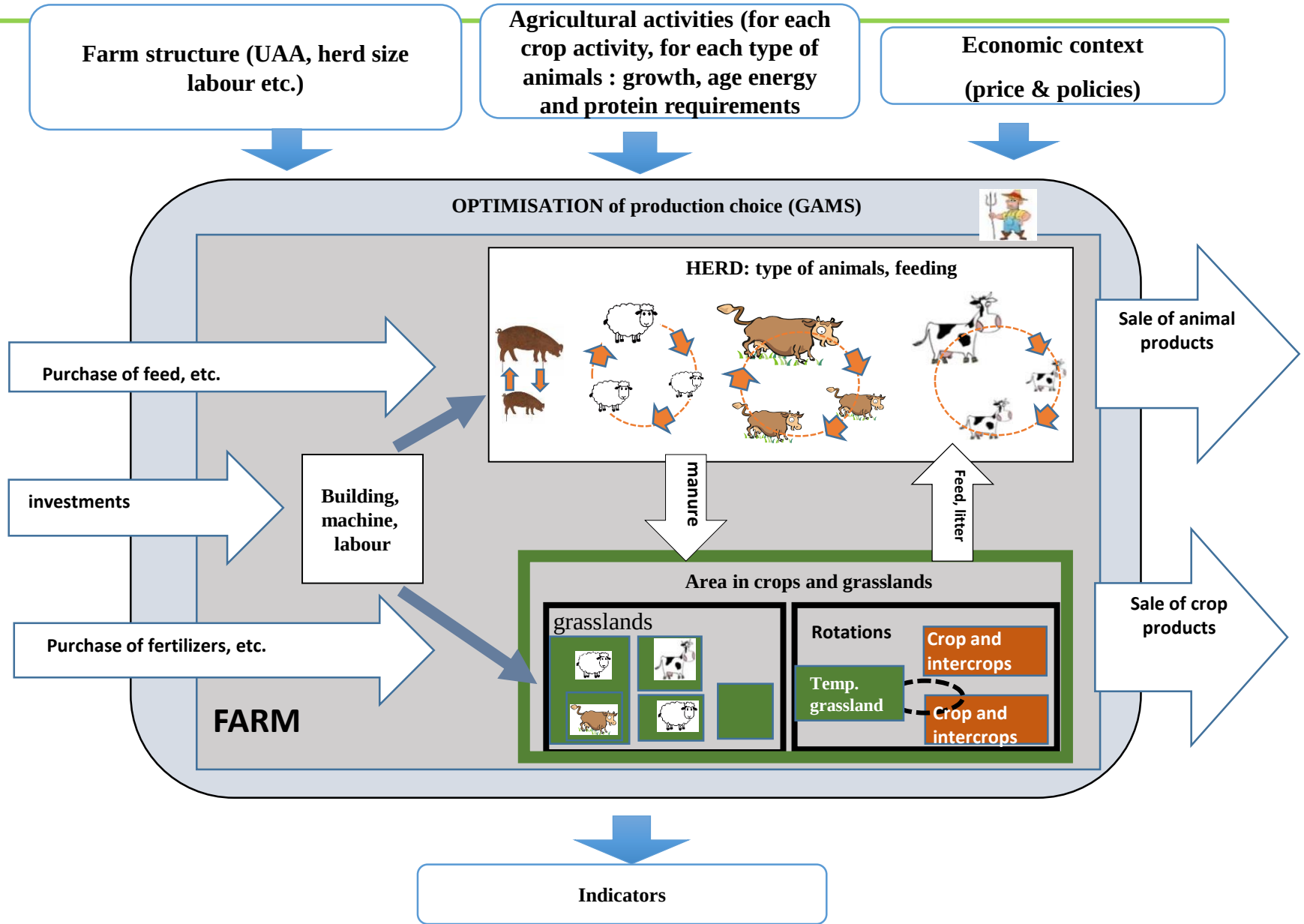
- Interview of 4 farmers in 2021 to complement surveys made in 2017 *(Steinmetz et al., 2021)* to identify
  - the main risks
  - Short and long term adaptation strategies



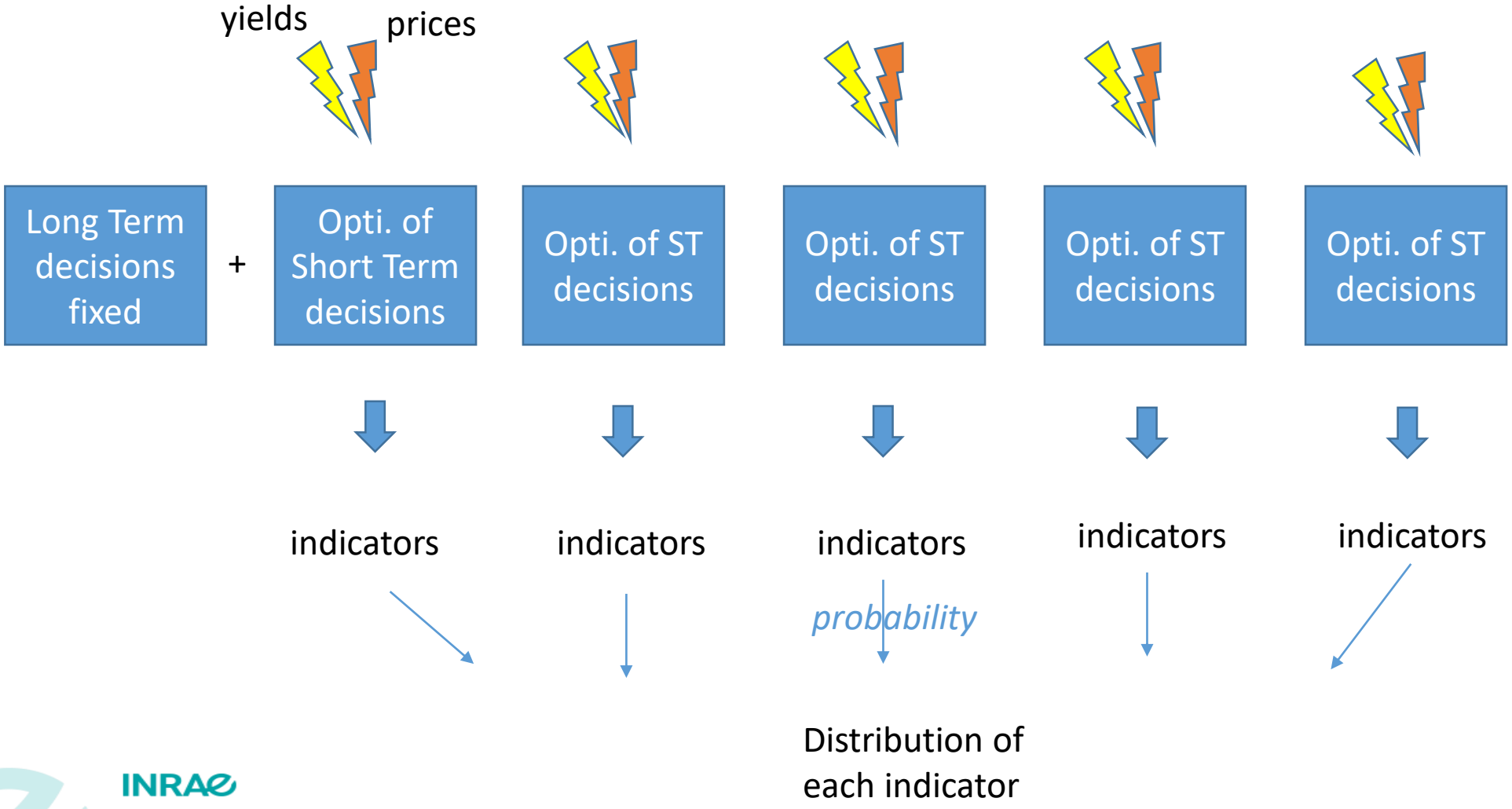
	F63	F65	F67	F74
Labour (worker unit)	1	1.6	1.3	1
Agricultural area (ha)	75	116	196	107
grasslands (% total)	80%	92%	86%	81%
Cows (heads)	15	28	39	47
Ewes (heads)	220	185	200	100
Consumption of own cereals	yes	yes	no	yes

Orfee bioeconomic model

Simulates the decision process and production process of farms with livestock, grasslands and/or crops, for one year



Simulation of risks with orfee



Results

Results: main risks for farmers

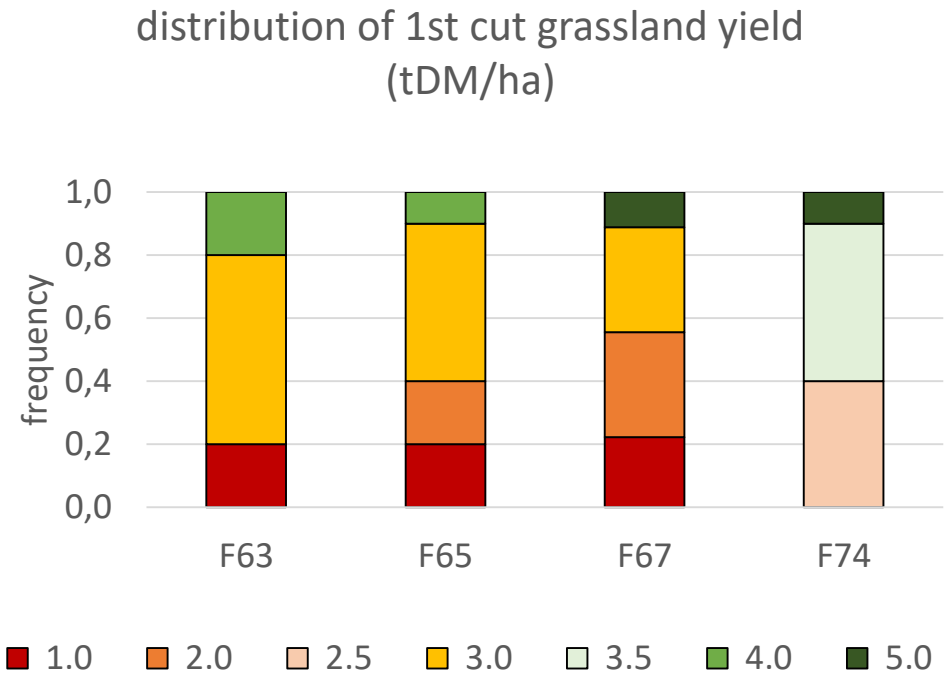
- Farmers have been asked to classify these risks :

low	medium	High

	Human Health	Plant disease	Public policies	Machine breakdown	Animal production	Input prices	Output prices	Climate
F63								
F65								
F67								
F74								

Risk for grassland production

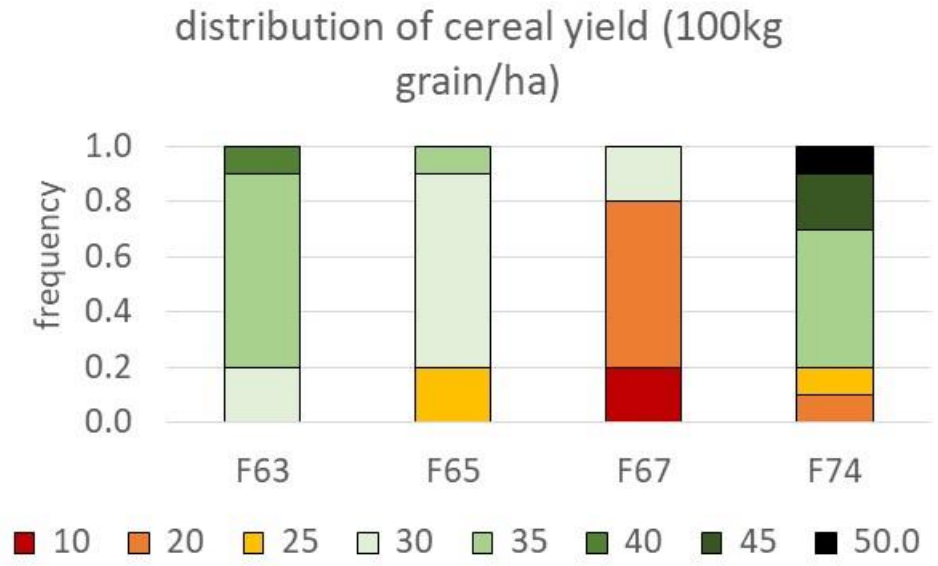
- Farmers have been asked the frequency of grassland yields over the last 10 years



- A majority of « bad years », except for F74 → bad years become normal years
- F65 and F67 have a higher proportion of low yield, but also lower stocking rates (0.6 vs 1.2)
- 2/10 years with 2/3 of grass less in fall
- F63 : - 0.15 of ewe productivity when grassland production is low

Risk for cereal production

- Farmers have been asked the frequency of wheat yields over the last 10 years



- Lower yields for F67
- Lower variability for F63 → different dates of seeding
- F74: higher variability

- Output prices
  - low variability over the last 10 years

Current adaptations and plans

Current adaptations

	↓ age or liveweight of animals sold	↑Sell cows	↓ mowing	intercrops	↑Feed purchase	↓Grazing
F63	+			(+)	+	+ (cows out of pasture in august)
F65				+	+	
F67	(+)		+	+	+	+ (ewes in lake shore)
F74		+	+	+	+	+ (ewes in mountain pasture)

Current adaptations

	Reduction of stocking rate	Keep sheep and beef?	Forage and crops	New enterprise	trees	insurance
F63	done	yes	↓ spring cereals, Legume for flour?	Poultry?	no	no
F65	Planned (↓ herd)	Stop beef	↑cereals?	Dairy for cheese	no	no
F67	done	yes	↑spring forage? ↑perm. grassland?	Poultry? Pig?	no	no
F74	Planned (↓ perm. grasslands)	yes	↑perm. grassland	?	no	no

Simulations

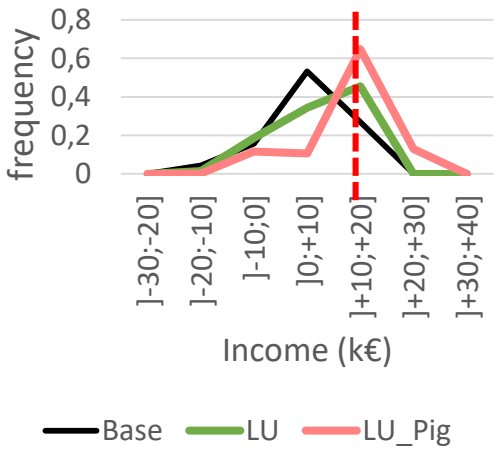
- Combination of hazard simulated
  - Spring grassland yield (+ forage price and ewe prolificity) x fall grassland yield x cereal yield x intercrop yield x animal price x cereal price x input prices (national index) = max 400 simulations

- Adaptation tested

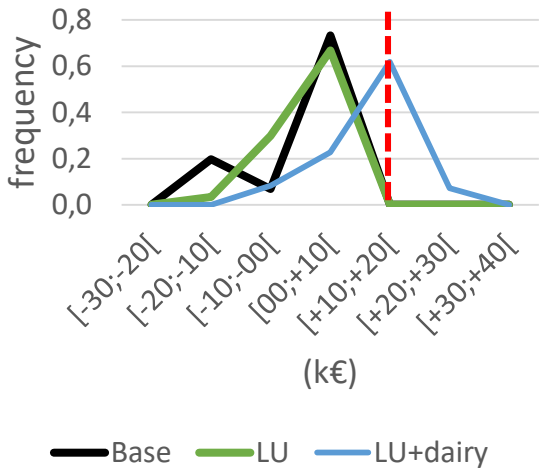
	Base	Reduction of stocking rate	new enterprise mix
F63	15 SCow +220Ewes	10 SC + 220 E	500 piglets +10 SC + 220 E
F65	28 SC+185E	80% of beef and sheep	19 dairy cows ; 185 E
F67	39 SC+120E		500 piglets + 31 SC + 96 E
F74	[39-47] SC+ 100E	+30 ha of perm. grasslands	500 piglets + [39-47] SC+ 100E

Distribution of income simulated

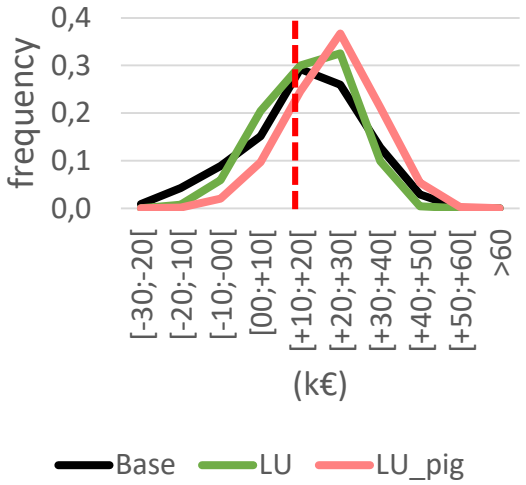
F63



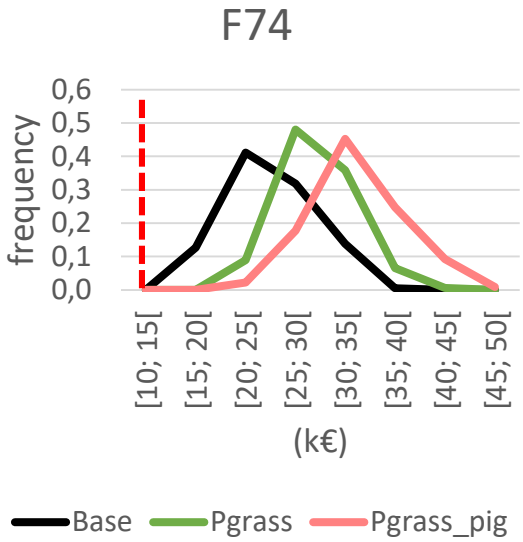
F65



f67



F74



	base	LU	pig
mean	5	7	12
SD	8	7	7

	base	LU	dairy
mean	11	10	22
SD	8	5	7

	base	LU	pig
mean	16.7	17.3	23
SD	15	11	12

	base	PG	Pig
mean	25	30	34
SD	5	4	5

Conclusions

Conclusion

- The most important risk = grassland yield variations
- All farmers plan to maintain or increase the mix of enterprise on their farm
- Reduction of stocking rate enables to reduce farm vulnerability… But the public compensations for drought are not taken into account
- Adding a pig enterprise increase total income and reduce the risk of very low income→ can offset reduction of SR