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Organization of an alfalfa hay sector between cereal farms, livestock farms and a local cooperative

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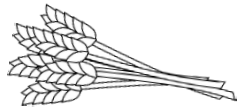
"Resilient livestock farming systems in the context of climate and market uncertainties"

Introduction

System specialization over the last decades:

- Area with high agronomic potential → 
- Least favored area or mountain area → 

Decline in forage legumes since 1970 (Magrini et al., 2017)

-low market opportunity and profitability for crop farms

… But forage legumes have potential agronomic and environmental interest

Introduction

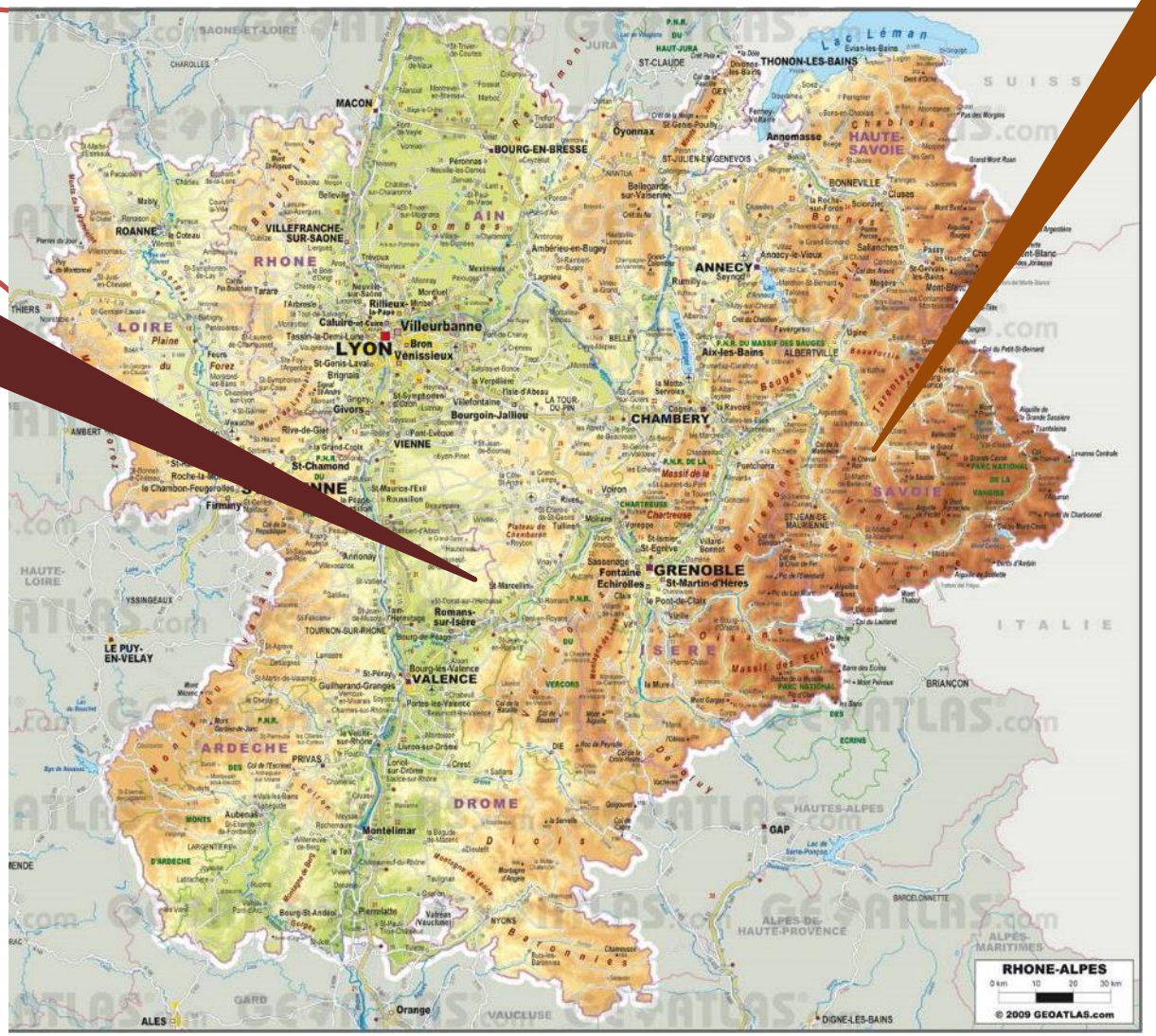
-How to reintroduce forage legumes into the agricultural landscape?

Assumption: more favorable markets can foster its development

What are the interest prices for crop farmers and dairy producer to plant or buy alfalfa hay?

Can contracts offered by local cooperative secure and increase local alfalfa production and consumption?

Material and method : Study areas



PLAIN AREA

Arable farm

1 Work Unit
170ha of UAA
with Soft wheat (67 ha),
Maize grain (71 ha),
Sunflower (14 ha),
Rapeseed (18 ha)

MONTAIN AREA

Grassland dairy farm

2,4 Work Unit
112 ha of UAA
with Grassland (89ha)
Barley (8 ha),
Triticale (9 ha),
Maize silage (6 ha)
71 dairy cows
Milk price 344€/1000L

Material and method : ORFEE model

Farm type: crop yield, rotation and animal production, available subsidies

Scenarios:
Annual Price, Policy, Yield over 2010-2017
Alfalfa : Price, Contract

CHOOSE:
Crop allocation, herd size, type of animals, diets, fertilizer use, worker unit, building size, etc.

MAXIMIZE:
Mean Profit

Under CONSTRAINTS:
Crops: rotation, machine operation, inputs..
Herd: herd renewal, feed requirement, housing
Land availability

INDICATORS

Production: inputs and outputs per activity (crop and animal)

net income variability

Climate change indicators

Material and method : Alfalfa characteristics

→<u>Effect on the following crop</u>: ↘ Mineral nitrogen requirement

Residu mineralization (+60 kg N/ha/2yrs)

↗ yield (+5%),

→ <u>Feed value</u> :

	UFL (energy)	PDIN (protein)	PDIE (protein)	DM	OM	MAT
Alfalfa hay	0,67	115	90	0.85	913	177
Grass Hay	0.67	60	62	0.85	920	100
Maize silage	0,9	42	65	0,3	954	69

(INRA, tables)

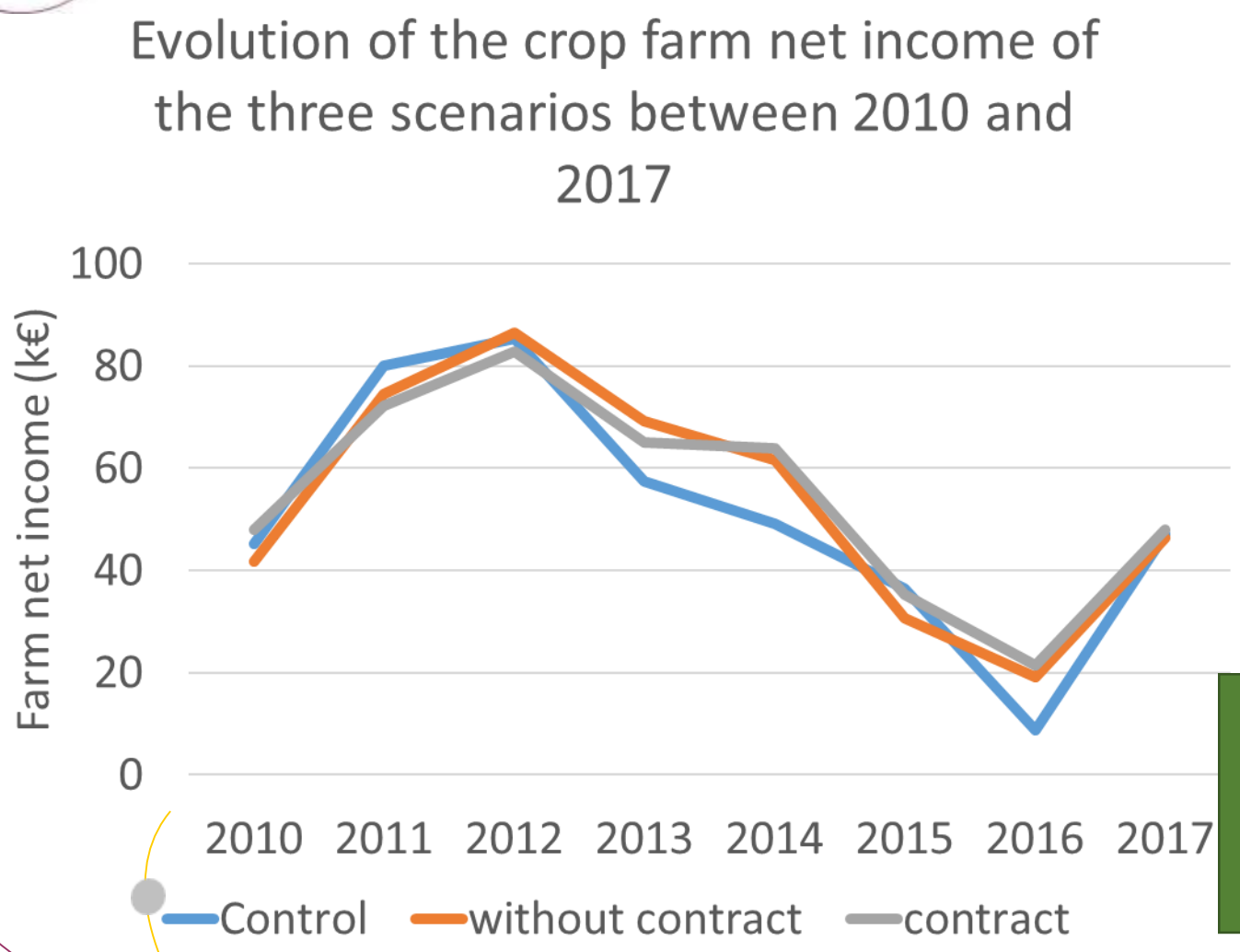
Material and method : scenarios

	Arable farm	Dairy farm
1. Estimation of the interest price	6 simulations with alfalfa price varying between 140 € and 190€	
2. Implementation of Contracts	- fixed price over three years - Obligation to crop the area of alfalfa each year	- fixed price all of years simulated - Obligation to buy the same quantity of alfalfa each year

Arable farm results

		Control	Alfalfa cultivation (alfalfa price = 167)
Technical results			
	Soft wheat	85	71
	Maize	56	56
	Rapeseed	29	/
	Alfalfa	/	43
Mineral fertization (kg/ha)	N	159	120 (↘)
	P	59	64
	K	54	113 (↗)

Arable farm results



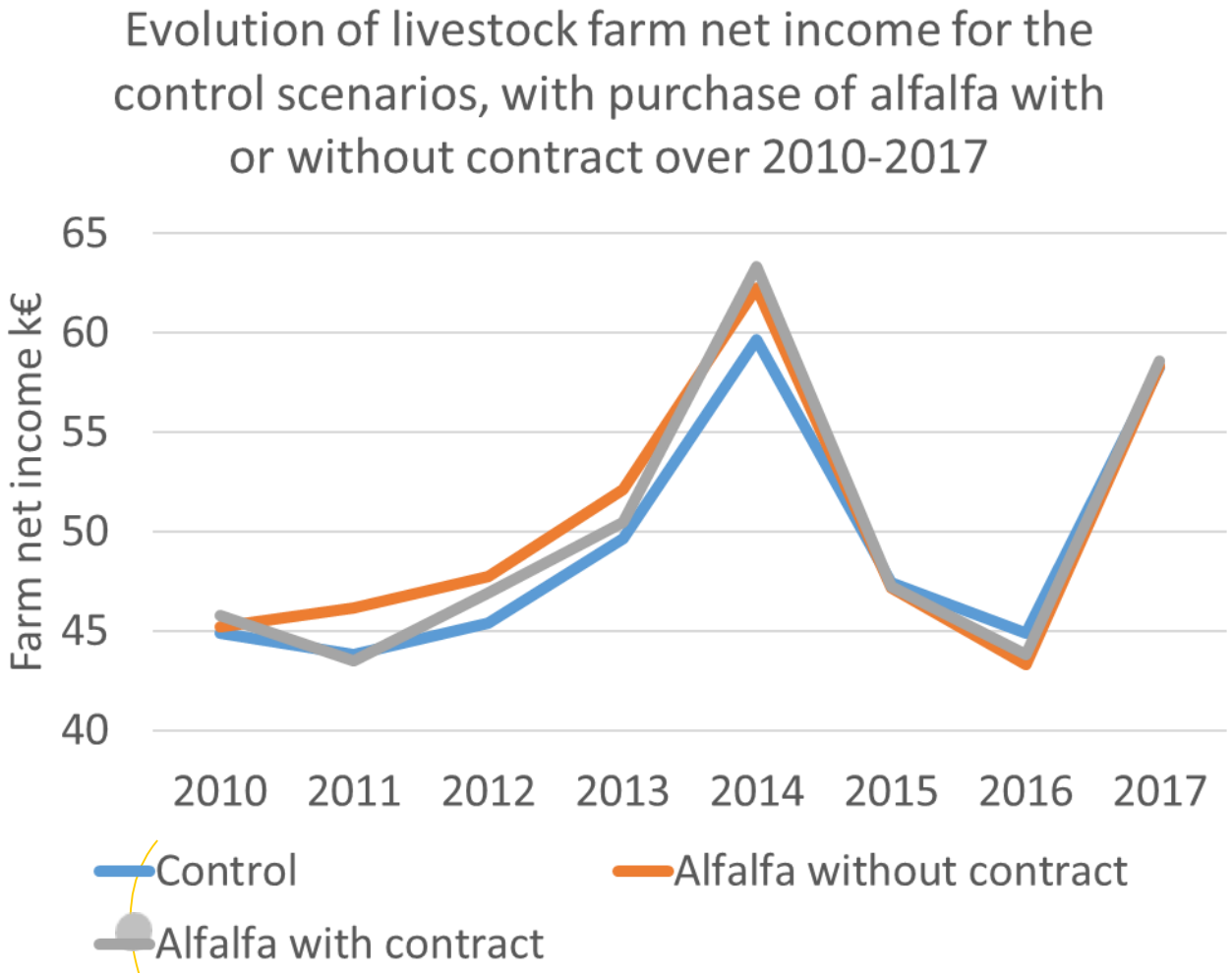
	Average alfalfa price (€/t)	Average net income (k€)	Standard deviation
Control		**51.2**	22.69
With Alfalfa	167	**53.8**	21.62
Alfalfa + contract	170	**54.6**	18.91

The interest selling price is 167€/t
↘ Net income variability with alfalfa and contract

Livestock farm results

		Control	Alfalfa without contract	Alfalfa with contract
Technical results				
	Grass silage	26	31	27
	Grass silage + hay	25	18	19
	Pasture	48	50	54
Milk cow number		71	73 (↗)	78
Stocking rate		1.00	1.04 (↗)	1.11
Harvested forage consumed (tDM/year/LU)		2.68	2.51 (↘)	2.18
Cereals consumed (kg/year/LU)		1277	1261	1301 (↗)
Energy autonomy		97.3%	97% (↘)	96%
Protein autonomy		97.8%	97.5% (↘)	96.7%

Livestock farm results



	Average alfalfa price (€/t)	Average net income (k€)	Standard deviation
Control		**49,24**	5,86
With Alfalfa	185	**50,28**	6,32
Alfalfa + contract	187	**49,94**	6,76

The interest buying price is 187€/t
↗ Net income variability with alfalfa and contract
↗ Cows number

Discussion & Conclusion

↗ Net income stability for the crop farmer
↘Breeder autonomy (original situation: autonomous)
Purchased alfalfa ↗ the number of cows and milk production

- Dependence on the socio-economic context → soybean meal market in corn/soybean meal systems *(Mawois et al., 2019)*

- Current subsidies = 25€/t

→Implement "sustainable" assistance on the establishment of fodder legumes

+ effect on alfalfa for the environment

→Interest of labelled products (Without GMO, or « local » protein)

→ Interest for farmers who are not forage self-sufficient for winter (alpine pastures in summer)

Thank you for your attention