Initial Stakeholder Meeting Report
Agroforestry with Ruminants in France

Work-package group 5: Agroforestry for livestock farmers
Specific group: Agroforestry with ruminants in France
Date of meeting: 1 July 2014 and 28 August 2014
Date of report: 10 November 2014
Location of meeting 1: Hucqueliers, Pas de Calais, France
Location of meeting 2: Lusignan Experimental Centre, near Poitiers, France
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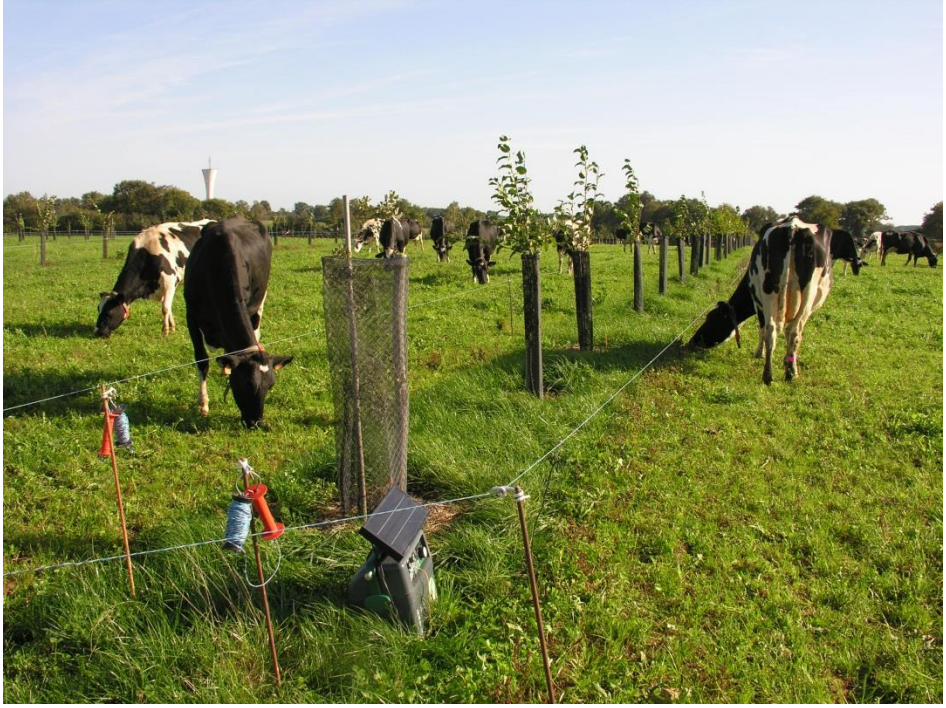

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1. Context

The AGFORWARD research project (January 2014-December 2017), funded by the European Commission, is promoting agroforestry practices in Europe that will advance sustainable rural development. The project has four objectives:

1) to understand the context and extent of agroforestry in Europe,
2) to identify, develop and field-test innovations (through participatory research) to improve the benefits and viability of agroforestry systems in Europe,
3) to evaluate innovative agroforestry designs and practices at a field-, farm- and landscape scale, and
4) to promote the wider adoption of appropriate agroforestry systems in Europe through policy development and dissemination.

This report describes one of about 40 initial stakeholder workshops to address objective 2. Further details of the project can be found on the AGFORWARD website: www.agforward.eu

2. Description of participants and systems

The first meeting took place at Hucqueliers in the Pas-de-Calais department, which is the most northern region of France, next to the Belgian border. The second meeting took at place at the INRA Lusignan Experimental Centre, near Poitiers in mid-west France.

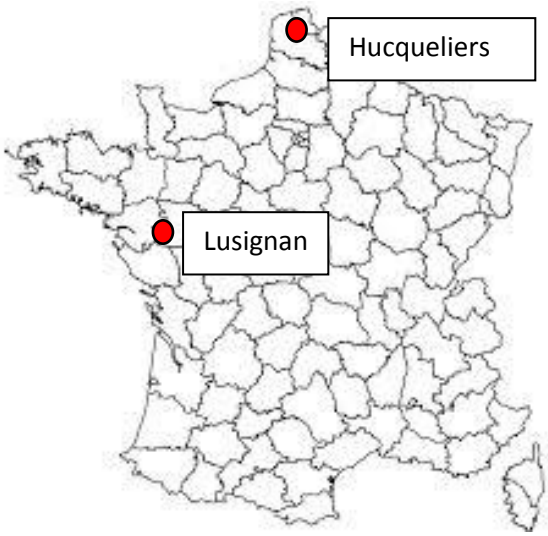

Figure 1. Location of the meetings

In total, 27 participants attended the two meetings, with the greatest number at the INRA Lusignan meeting. In addition to the attendees, the questionnaire was also answered by a farmer and a manager of the experimental farm of an agricultural secondary school. The attendees included nine farmers, farm managers or representatives of the Chamber of Agriculture (Table 1). Others present included those involved in research and development, field tree specialists, and students. The experience of agroforestry amongst the farmers was diverse (Table 2). Two contributed to the development of a national agroforestry network in the mid-1990s looking at the production of timber on grassland on sheep and cattle farms. These systems still function. Three farmers were looking to implement agroforestry on their farm. The livestock included dairy and beef cattle, sheep, goats, and poultry. A number of the farmers were interested in organic systems.

Table 1. Professions of those present

Description	Number
Dairy, cattle, goat or sheep farmer	5
Advisors or Manager from Chambre d'Agriculture	4
Researcher or Technician from INRA	4
Manager or Director from Institut de l'Elevage	3
Agroforestry Advisors from AGROOF	2
Project Managers from Défis Ruraux	2
Student	2
Field Tree or Agroforestry Technician	2
Specialists	1
Coordinator	1
Animator	1
Grassland System leader	1
Farm Research Director	1
Agricultural Adviser and Farmer	1
	30

Table 2. Example profiles of the types of farms represented

Location	**Characteristics**	**Agroforestry system**
Poitou Charentes	54 ha in organic farming 250 sheep; 1000 m² of poultry rotational grazing	11.5 ha of walnut, true service tree, cherry established in 2011
Lorraine	280 ha, including 140 in Natura 2000 and 140 in cereal cultivation and temporary grasslands 70 cows and 200 sheep	26 ha planted between 2009 and 2013 (alder, ash, hornbeam, rowan) 11 ha grazed by dairy cows from spring to autumn and winter sheep. rotational grazing 2 ha of orchards continuously conservation grazed by sheep 9 ha true service trees grazed by sheep
Poitou Charentes	Goat breeding	Project
Poitou Charentes	73 ha with 40 grassland 270 goats and 150 lactating ewes	Project
Poitou Charentes	Mixed farming system including suckler cows, lactating ewes, and organically reared poultry	A poultry agroforestry system
Poitou Charentes	Bovine milk cheese processing	Objective of establishing an orchard near
Nord Pas de Calais	Mixed farming with continuous grazing of beef cattle	65 tall stem apples on a parcel grazed by sucklers cows. Established in 2003 and 2013
Nord Pas de Calais	Retired farmer	1 ha grazed by sheep (ash, walnut, oak) Continuous grazing all year
Nord Pas de Calais	Polyculture with bovine milk	1 ha grazed by cows at night

3. Description of the sites

The site at Hucqueliers has been in place since the late 1980s. It comprises a one hectare plot established for timber production and it includes different species. The plot is regularly grazed by a flock of sheep. So far no trees have been harvested.

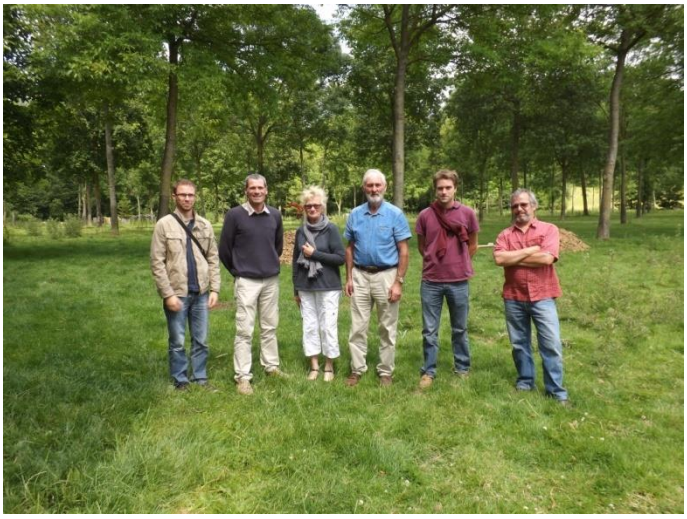

Figure 2. Hucqueliers meeting

At the Lusignan site, the participants visited one agroforestry plot from an INRA facility, which is part of a mixed crop-dairy system experiment called "OasYs". This plot is cropped following a seven-year-rotation (five years of grassland – two years of annual forage crops) and grazed by dairy cows. In February 2014, 200 trees (*Fraxinus excelsior*, *Morus alba*, *Ulmus*, *Alnus cordata*) were established in four agroforestry lines with the aim to be grazed as pollards in six to seven years. In the meantime, trees are protected from cattle by an electric fence.

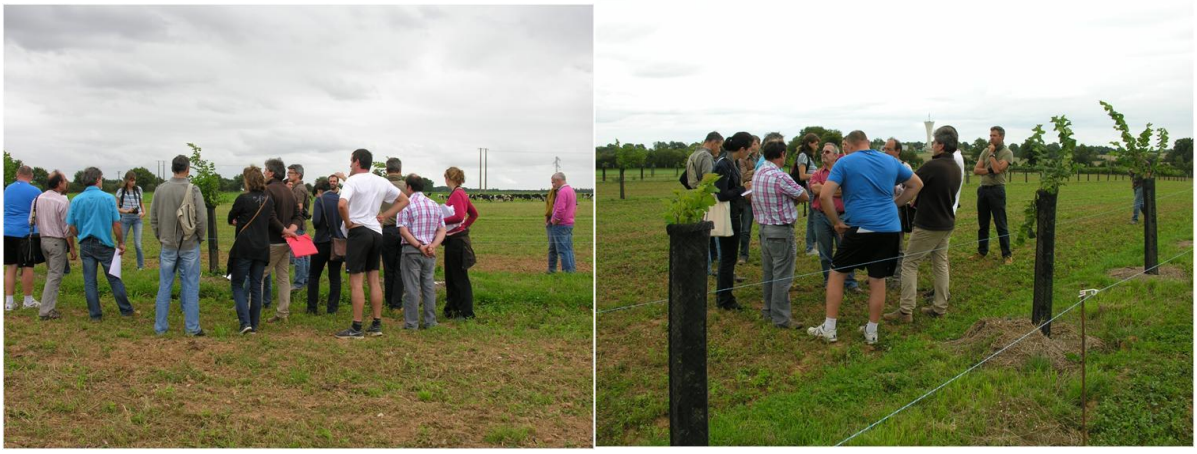

Figure 3. Images from the Lusignan meeting

4. Ranking of positive and negative aspects

All the responses to the questionnaires are collected in the two tables below ranking the positive aspects (Table 3) and the negative ones (Table 4). Positives aspects of agroforestry were ranked by the participants from 1st, the highest rank, to a maximum of 10th. To help rank the responses, a simple weighted mark was calculated taking into account both the number of times the item was cited and the marks awarded to it.

Weighted mark = (10 – (Sum of points / frequency)) * frequency

The higher the score, the higher the item has been marked and / or more frequently quoted.

Positive aspects of agroforestry

The most rightly ranked positive side of agroforestry was "Animal health and well-being". During the discussions it appeared that the dominant focus was on the improvement in animal welfare rather than health. The reasons cited included the role of trees on air flow and their role in shading. The impact of agroforestry on the image of agriculture was also ranked highly. Seven participants ranked it within their top three positive attributes and 21 participants mentioned it in their top 10.

Production and diversification were also ranked has high positive attributes. If product diversity and production of wood and fruit are combined, it obtains a score equivalent to that of health and welfare with six participants ranking it first. Key potential tree species included chestnut and apples. Currently in Limousin, chestnut producers are thinking on this issue of maintenance with animals. In the discussion, there was no clear consensus of the most appropriate species for the long-term market. "Woody forage production" also was ranked in the top five by six participants.

After the production aspects, the positive environmental attributes were highly cited including the general environment, biodiversity and landscape. In the discussion, there was an interest in planting trees in areas of wet soil to provide natural drainage. It was felt that trees could also regulate populations of small rodents by promoting the presence of predators.

Negative aspects of agroforestry

The most highly ranked negative aspect of agroforestry was the complexity of work, and associated issues for labour and mechanisation. In the discussion, agroforestry systems were seen as generating more complexity in work such as the control of animals, issues of crop and tree management, and issues of mechanization including machine size. The protection of trees against game and livestock was also seen as a barrier to the establishment of agroforestry.

Socio-economic issues such as administrative burden, the owner farmer relationship, and cash flow were also ranked negatively. The problems of predicting the timber market in 20 or 30 years, when the trees are mature and in a context of climate change was raised. Some of the responses seem contradictory. For example, whereas nine participants saw a negative effect of agroforestry on pasture production, six considered that the effect was positive.

Table 3. Positive aspects of agroforestry as ranked by 29 participants from 1, the highest rank, to 10.

		Lusignan																					Huquelier								Freq	No 1	Score
	Aspect	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**			
Production Effects	Animal health and welfare	2	1	1	2	1		4		7	3	9	1	10	1	2	3	6		1	1		2	2	7	2	2			3	23	7	**157**
	Animal production				3											8	2		1			6			6	3		8			8	1	**43**
	Pasture production	2				10	5						8						4		2					1					7	1	**38**
	Crop/pasture quality/safety		4		4		1			4				3		7			5	2				8		6		10		4	12	1	**62**
	Disease and weed control				1	2																									2	1	**17**
	Diversité des productions	1	2				6	8			2		2	9	2		4			3	3	1						9	8		14	2	**80**
	Timber/wood/fruit/nut product		10	5		5								2		1		1	8	4			1	4	8	4	7		1		14	4	**79**
	Timber/wood/fruit/nut quality											2								6					5	8			2		5	0	**27**
Management Effects	Labour																											2			1	0	**8**
	Mechanisation																									7					1	0	**3**
	Originality and interest						10	6		6	9				8				6			7						4			8	0	**24**
	Tree regeneration/survival		7								6							10			5				4			5			6	0	**23**
Environment effects	Biodiversity and Wildlife			6	5	3	8	7				2		4	4			4	7	9	6	3		5	3				5	1	17	1	**88**
	Carbon sequestration	3					3			8		8				9						8		10		10	9			8	10	0	**24**
	Change in fire risk															3															1	0	**7**
	Climate moderation	9	9		6																				9						4	0	**7**
	Control of manure/noise/odour											5	7																		2	0	**8**
	General environment		3		7	8		1			7	4			9		5	2		1							1	7	10	5	14	3	**70**
	Landscape aesthetics	5		4	8	4		9		2	5		10	6	5			5			7			3	1		8		3		16	1	**75**
	Reduced groundwater recharge												9										7								2	0	**4**
	Runoff and flood control	6			9	7				5					6		1	9				9					6			2	10	1	**40**
	Soil conservation	7		2			2	2												8				6			5				7	0	**38**
	Water quality	8	6	3		6									10	4					8		3	7			4				10	0	**41**
Socio-Economic Effects	Administrative burden												3															5			2	0	**12**
	Business opportunities			5																		4									2	0	**11**
	Cash flow												4											1				3			3	1	**22**
	Farmer image		5			9	9	3		10		7	5	1	3	5		3	3	10	9	5	5		2	9	3		6	7	21	1	**91**
	Income diversity	4	8				7	10			1							7		5		10	8	9		4		6	4	9	14	1	**48**
	Local food supply										4								9	7											3	0	**10**
	Marketing premium									9			6	5							10										4	0	**10**
	Profit													7	7																2	0	**6**
	Farmer/hunter relationship																		6									1		6	3	1	**17**
	Farmer/owner relationship																										10				1	0	**0**
	Rural employment																						10								1	0	**0**
	Subsidy and grant eligibility	10												8									6			5					4	0	**11**
	Tourisme							5			8												9		10				7		5	0	**11**
Other	Rural économy									3																					1	0	**7**
	woody forage production		2				4			1		3				6		8	2			2									8	1	**52**

Table 4. Negative aspects of agroforestry as ranked by 29 participants from 1, the highest rank, to 10.

		Lusignan																					Huquelier								Freq	No 1	Score
	Aspect	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**			
Production Effects	Animal health and welfare																																
	Animal production														8															7	**2**	**0**	**5**
	Losses by predation		3			4	6			4	7	3	5	7				5	1	3											**11**	**1**	**62**
	Pasture production							7						6	4								7		8	3	5		8	4	**9**	**0**	**38**
	Crop/pasture quality/food safety														6								8						3		**3**	**0**	**13**
	Disease and weed control													4					3						7	7		9	9	6	**7**	**0**	**25**
	Timber/wood/fruit/nut quality														10																**1**	**0**	**0**
	Complexity of work	1	1	1		7		6		1			3	3	1	4	1	1	2			3	2	3			7	3	6	9	**20**	**7**	**135**
Management	Inspection of animals		2		1	3				6					2	1	5	6	4	1							4				**11**	**3**	**75**
Effects	Labour	3				1	1	10				1	2	1		2	3			7	2	1		4			2	8	2	2	**17**	**5**	**118**
	Management costs			3		5	2			2		5	6			3							3	2	6	1			10		**12**	**1**	**72**
	Mechanisation	2		2		6	3	5		5	4	3		2			2	2			3		4	6			10		4	1	**17**	**1**	**106**
	Originality and interest														5					2							1				**3**	**1**	**22**
	Project feasibility		4		2			2		8	8		1	5											5	2				8	**10**	**1**	**55**
	Tree regeneration/survival				3	2									7							4	9							5	**6**	**0**	**30**
Environment effects	Carbon sequestration																											4			**1**	**0**	**6**
	Change in fire risk					8																	10								**2**	**0**	**2**
	Climate moderation																											5			**1**	**0**	**5**
	Reduced groundwater recharge														9																**1**	**0**	**1**
	Runoff and flood control																								9						**1**	**0**	**1**
Socio-Economic Effects	Administrative burden	5	5				4	4		9			4					3					1	5	1			7	1		**12**	**3**	**71**
	Business opportunities														3						6						3				**3**	**0**	**18**
	Cash flow	4								7	2						4	5		5	1	5		1					7	10	**11**	**2**	**59**
	Farmer image																									4					**1**	**0**	**6**
	Inheritance and tax			5				9		10														2	2	9	9				**7**	**0**	**24**
	Régulation	7	6				5	1			3	1						4		4	4					8					**10**	**2**	**57**
	Local food supply																											1			**1**	**1**	**9**
	Marketing premium																								10						**1**	**0**	**0**
	Market risk																									10		2			**2**	**0**	**8**
	Opportunity for hunting				4						6																	10			**3**	**0**	**10**
	Profit							8																	4			6			**3**	**0**	**12**
	Farmer/hunter relationship																									6					**1**	**0**	**4**
	Farmer/owner relationship	6		4				3			5					5				6	5	2	6	7	3		8		5		**13**	**0**	**65**
	Rural employment																									5					**1**	**0**	**5**
	Subsidy and grant eligibility										1					6							5				6				**4**	**1**	**22**
Other	Training for farmers																						8								**1**	**0**	**2**
	Absence of knowledge	8								3																					**2**	**0**	**9**

5. Qualitative written and oral responses

In the discussions at the meetings, the key constraints and challenges were also identified from the perspective of i) farmers, and ii) technician and researchers. The potential solutions and possible research themes were also identified. This included the provision of technical references and the formation and support of farmer groups.

Constraints and key challenges

Farmers

- Protect trees during the growth phase
- Adaptations to grassland management, grazing
- The choice of species in relation to soil constraints
- Improve welfare in summer conditions
- Adaptation of tools available today including "Cooperative farming equipment"
- Tree density

Technicians and researchers

- Economics, organization of work
- Contribution to the independence of farms, new resources
- Improved water and carbon balances, energy efficiency
- Improve the resilience of farming systems / climate change
- How to design and manage an agroforestry system
- Extending the grazing period
- Improving the welfare
- Maintaining soil quality, fertility
- Job management: maintenance, tree size, longer
- Have economic technical references for the promotion and development
- Having a training time necessary
- Forage contribution of trees: quantity and value
- Varietal associations in apple orchards
- Forage quality under the trees
- What types of wood are best suited

Solutions and topics

Farmers

- Training for implementation, the choice of species, maintenance
- Promote exchange between farmers

Technicians and researchers

- Develop technical and economic references for livestock systems
- Specify the trees that are the most appropriate (e.g. in size)
- Set design rations including production trees, nutritional value of tree resources
- Test different species and the effect on value
- Form farmer groups, network
- Social and feeding behaviour of animals and impact on animal performance
- Organization of work on farms
- What conditions of development in large farms?
- What is the response time after the establishment of an agroforestry system?
- How to install pollards in agroforestry system, interest for "plessage" (hedge laying)

6. Conclusions

During the two days, farmers and their advisers mentioned the following key technical questions:

- Which methods are to be used for easily and efficiently protecting recently established trees against livestock grazing?
- How should trees or shrubs be spatially organized to optimize woody and herbaceous forage production and animal welfare (while avoiding the accumulation of dung under the trees)?
- What are the nutritional (and medicinal) value of trees and shrubs? What place can ligneous forage make in the diet of cows?

In terms of advice and support, there is a strong demand in terms of:

- advice and accompaniments for the practical implementation of these new systems
- the development of technical references and especially economic ones

In a more general way, farmers are looking for practices and techniques that limit the complexity and load of work induced by agroforestry.

Finally, we noted that the environmental impact of agroforestry farming was seen as positive in all the cases, and that there was no specific request for deepening this issue regarding the development of agroforestry in ruminant systems.

7. Acknowledgements

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