

Work-package group 3: Agroforestry for high value trees

Specific group: Chestnut agroforestry in Galicia, Spain

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Location of meeting: Estación Científica do Courel, Seoane, Lugo, Galicia, Spain

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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 system

Agroforestry is a traditional land use system in O Courel in the Lugo province, Galicia in north west Spain. In this area, chestnut (*Castanea sativa* Miller) production has always been linked to human diet. O Courel belongs to the Natura 2000 network, is a priority area for birds and is included in the recovery plan for grizzly bear populations in Galicia and occupies 102,681 ha. These legal protection measures provides evidence of the high natural and cultural value of the area. The valleys in O Courel are surrounded by mountains with vegetation comprising ancient chestnut trees. The chestnuts produced are recognized under the label of Protected Geographical Indication (PGI), and are mainly exported to selective markets in Europe. Moreover, the climate, chestnut tree vegetation and the rich and varied flora of the area allow the production of mushrooms and high quality honey appreciated by consumers.

3. Participants

The meeting on 25 August was attended by 26 stakeholders of which 22 answered the questionnaire. Of these: twelve were smallholders of chestnut trees or producers and harvesters of chestnut fruits, two participants worked in chestnut processors, and five belonged to associations related with chestnut production. One participant worked with medicinal plants, one was a representative of the Rural Development Group “Ancares-O Courel”, and one was a honey producer. The team from the University of Santiago de Compostela (USC) comprised of three presenters/speakers, four assistants and one photographer.

Considering the age of the participants, there was a broad age range with seven people aged 20-35 years, five persons aged between 35 and 50, eight people aged 50-65 years, and two older than 65. The stakeholders completing the questionnaire comprised twenty men and two women. The stakeholders were mainly from O Courel, although some stakeholders came from other parts of Galicia (Ourense) and even from other regions (O Bierzo, Leon).

4. Introduction session

The meeting comprised an initial introduction session and a field visit. The meeting was held at the Estación Científica do Courel (<http://www.usc.es/es/servizos/eccourel/>) (Figure 1).



Figure 1. Estación Científica do Courel (Lugo, Galicia, NW Spain).

The meeting started at 10:30 am with a welcome from the Mayor of Folgoso do Courel (Mrs. Dolores Castro) and the Director of the Estación Científica do Courel (Antonio Rigueiro Rodríguez). It was followed by a brief presentation of the AGFORWARD project and of the agroforestry concept, given by the AGFORWARD lead participant of the USC (Maria Rosa Mosquera Losada). A second presentation was given by the secretary of the PGI chestnut of Galicia (D. Manuel Vilariño) on the quality mark of chestnuts from Galicia (PGI, Castaña de Galicia"). In a third presentation, Juan Luis Fernández Lorenzo, from USC, presented an example of innovation based on the vegetative propagation of quality varieties of chestnut trees by micrografting (Figure 2).



Figure 2. Photos of the presentations

This was followed by the presentation of the 17 minute film: 'Agroflorestas: oportunidades e desafíos', with Portuguese subtitles, directed by F. Liagre and N. Girardin. Before the coffee break, Maria Rosa Mosquera Losada explained how to complete the questionnaire, which sought to highlight the key positive and negative aspects of the agroforestry systems (section 5 and 6 of this document).

There was then an open discussion session focusing both on the young and adult plantations of chestnut trees (Figure 3). Most participants identified the advantages, problems and challenges for the implementation of agroforestry systems in plantations of the region. The participants were then offered a lunch in a local restaurant, where the discussion on the main subjects continued until 4 pm.



Figure 3. Photos of the participants filling in the questionnaire and in the open discussion.

The participants then visited an area of chestnut trees at “Souto de Mercurín”. The site includes an area where the roof of a large limestone cave collapsed several centuries ago, while some walls remained standing. Chestnut trees grew at different levels among the remains of the limestone cave. During the field visit the discussion on the main subjects continued until 6 pm (Figure 4).



Figure 4. Photos of the field visit.

5. Questionnaire results: ranking of positive and negative aspects

Twenty one participants completed a questionnaire where they ranked the importance of the positive and negative aspects of agroforestry, from 1 to 10, being 1 the highest rank. Despite explanations, most participants provided the same ranking to different aspects; they explained that they felt that some characteristics had the same ranking for them. To help interpret the data, an aggregate score for each aspect was determined using the scoring system described in Table 1 as used by Crous-Duran et al (2014). The key aspects are considered are headings of production, management, environment, and socio-economic effects.

Table 1. Scoring points for each the rank

Rank	1	2	3	4	5	6	7	8	9	10
Points	25	18	15	12	10	8	6	4	2	1

Positive aspects

Following the approach of Crous-Duran et al (2014) of giving 25 marks to a ranking of 1, and 1 mark to a ranking of 10, it was possible to sort the aspects in order (Table 2).

Socio-economic effects: nine out of 21 respondents gave rural employment a ranking of “1” and eight ranked “Business opportunities” with the same rank. This was probably important as many young people leave O Courel due to the lack of job opportunities.

Production effects: seven respondents ranked disease and weed control with a ranking of 1; “crop or pasture quality/food safety” was given a ranking of 1 by six respondents and “animal health and welfare” also featured highly.

Environmental effects: nine respondents gave biodiversity and wildlife habitat a ranking of 1; “Soil conservation” and “carbon sequestration” also ranked highly.

Management effect: “tree regeneration/survival” was ranked 1st by eight respondents. In the open discussion, most participants indicated the importance of this aspect to reduce costs. “Project feasibility” was ranked high by six respondents.

Negative aspects

Management effects: the most negative aspect of the agroforestry system, as ranked 1st by four respondents, was the “complexity of work (Table 3). Problems with mechanisation and management costs also featured highly. The region is characterized by the frequent occurrence of steep slopes

Production effects: two respondents gave “losses by predation” a ranking of 1; probably because O Courel is a high mountain region where problems associated to the presence of predators such as fox or wolf have always been present. Two people also selected “crop or pasture quality/food safety” as a key negative aspect of the agroforestry system. This result contrasts with the positive results where crop or pasture quality/food safety was selected by other respondents as positive. Perhaps “Crop or pasture quality/food safety” was considered positive by respondents who associated this aspect to the diversity of the production, while it was considered as negative by respondents foreseeing a production reduction due to the introduction of new crops with lower returns.

Table 2. Positive aspects of the chestnut agroforestry system as ranked by 21 participants

Aspect	Ranking by 21 participants																				Σ	
Production effects																						
Disease and weed control	7	2	2	1	3	4	1		4	1	7	3	1	2	6	7	3	1	1	1		324
Diversity of products	6	1		4	1	8	2		1	2	10	2	3	3	2	6	2	1	3	3	4	295
Animal health and welfare	1		1		5	7		5	3	2	7	4	2	3	1	10	2	2	3	1	1	287
Crop/pasture production	4			5		8	3	1	3	1	8	3	1	2	2	3	2	2	3			252
Crop/pasture quality/safety	5		3			7	4		1		9	3	1	1	1	9	1	1	3		3	242
Timber/wood/fruit/nut quality	9		5	2	2	7		3	2		10	3	1	2	5	3	1	4	1			233
Animal production	3		4		4	7		4	2	2	7	6	2	3	3	4	1	2	3			225
Timber/wood/fruit/production	8			3		8		2	3		10	1	1	3	2	4	1	4	2		2	225
Losses by predation	2					5	5		5	2	8	4		4	2	3	2	4	3	2		190
Management effects																						
Tree regeneration/survival		1	2	1	3	6	3	1	2		10	2	1	3	1		1	1	1		8	312
Project feasibility	2		1	2	2	5	1		2		10	1	1	4	3		1	2	1			278
Originality and interest			5	3		4			1		10	2	1	4	2		3	2	3	2		202
Complexity of work	8		3	5		5	2		5		9	2	3	4	3	7	2	3	3	3	10	199
Mechanisation	7				1	6	5	2	4		10	3	9	3	7		2	3	1	2	9	196
Management costs	1		4			7			6		9	3	2	5	2		1	3	1		5	189
Labour				4	5	7	4		6		10	2	2	5	3		1	2	3		7	174
Inspection of animals	5				4	4		3	4		7	3	5	4	4		2	4	3	5		171
Environment effects																						
Biodiversity and wildlife hábitat	1	1	1	1	1	3			1		10	2	1	2	1	10	2	1	3		6	319
Soil conservation	2	4	2	2	4			3	4	1	9	3	1	4	2		1	1	2	3	3	300
Change in fire risk		3	4	3	3	5			3	1	10	2	1	2	4	7	1	2	2	1		273
General environment			3	4		6	3		1	1	10	2	1	2	2		2	2	3	1	9	258
Landscape aesthetics			5	5		7	1	2	3		9	3	3	2	3		1	1	3		1	239
Carbon sequestration		2			2	4			1		10	1	1	2	1	9	2	1	3		10	228
Water quality	5	5					4	4	3		8	3	1	2	2		2	4	2	1	4	224
Control of manure/noise/odour						9	2	1	2	2	8	2	2	5	2		1	4	4			198
Runoff and flood control	1					6	5		3		10	2	1	3	4		1	3	3			184
Climate moderation					5	8			3	2	10	2	1	4	2		1	3	3			176
Reduced groundwater recharge						6			2		7	3	4	3	3		1	5	3		2	157
Socio-economic effects																						
Rural employment	1		2	1	3	10	5	4	2	1	3	1	1	2	6		1	1	1	1		340
Business opportunities	1		4	2	1	8	4		1		9	1	1	2	7	9	1	1	1		5	284
Income diversity		1	3	4	2	7	2		2		7	3	4	4	3		1	1	2		8	244
Profit		3				2	1		2	6	10	2	1	2	3		3	1	2	1		244
Local food supply	7	2	1		4				2		7	3	1	2	2		2	2	3			212
Farmer image			5						2	1	5	5	2	3	4	9	2	3	2			171
Tourism		4							5	3	10	1	2	2	2		3	3	3		9	164
Subsidy and grant eligibility						5		5	1	6	2	2	2	3	4				3		7	155
Marketing premium				5			3		4		8	2	5	5	5		1	3	3			144
Farmer/hunter relationship	5							2	6	4	10	8	8	5	5		1		3		1	142
Administrative burden									5		7	4	4	4	6		1	4	5	1	10	133
Farmer/owner relationship								3	3	4	10	8	1	4	4				2		2	132
Opportunity for hunting	3							1	5	3	10	8	10	6	5		3		4		3	131
Regulation				3					3		6	5	5	5	5		1	4	3			130
Inheritance and tax									4		5	4	5	3	5		1	5	1			129
Cash flow									2		8	4	4	5	6		1	4	2		6	127
Market risk					5				3		9	3	5	4	5		1		1			124

Table 3. Negative aspects of the chestnut agroforestry system as ranked by 21 participants

Aspect	Ranking by 21 participants																				Σ		
Production effects																							
Animal production		1		2				2	7	3			8	8	8	6	4	2	3	3			162
Losses by predation				1	3			5		6	2		7		6	5		1		3	8		144
Crop/pasture quality/safety	2				1			4		8	1		7	9	10	7		2	5	3			142
Crop or pasture production	1				4	2	3	5	8	2		8	7	9	9	8				3		9	137
Timber/wood/nut production					2	3			4	8			9	9	7	7		1	1			7	121
Animal health and welfare					5				1	8	3	8	10	8	10	7		1		3	10	10	112
Disease and weed control								1		5	3		8	9	10	8	4	2	4				103
Timber/wood/fruit/nut quality									3	7		8	8	9	8	5			1			6	78
Diversity of products						1	2			9		7	8	7	10	7						8	72
Management effects																							
Complexity of work				3	1			2		5	1		5	7	7	7		1	1			10	172
Mechanisation				1				5	2	2			8	1	7	7		1	3			8	156
Management costs			1	2	2				5	3	1		10	8	6	7						9	132
Inspection of animals				4	4				1	5	3		7	5	8	6	6		2				128
Labour	1			5	3			4		3			8	8	7	8		2					113
Project feasibility								1	3	7			6	9	7	7		2	5				96
Originality and interest		2							4	8			7	9	9	7			4				62
Tree regeneration/survival								3	6	6			7	9	9	9						7	49
Environmental effects																							
General environment	3					1	3	3		8	1	8			10	7						9	112
Control of manure/noise/odour								2	3	7					9	7		1	1				97
Landscape aesthetics								1		6	2	8			9	8		2	5			8	93
Water quality								4	1	9	1				10	9			4			5	89
Reduced groundwater recharge					2					7	1				8	8		2				7	81
Soil conservation					4				2	8	2				10	9		2				6	81
Runoff and flood control					3			5		8	1				10	8			2				77
Climate moderation		2			2				4	6					10	8			3				76
Carbon sequestration					1		2			9					10	9		2				10	67
Change in fire risk						1				8		8			10	9							36
Biodiversity and wildlife habitat					5					9					10	9							15
Socio-economic effects																							
Market risk			1		2	5				7	4		2		7	5		2	2				141
Administrative burden	2			4		5				7	1				6	5			1			1	139
Inheritance and tax	3			1	1					6	2				5	6						2	127
Farmer/owner				2			1		3	7			2		5	5			4			10	115
Regulation					4					5	1	7			5	5		1					98
Income diversity							3	2		9	1				8	6		2					90
Rural employment							2	5	1	8	7		9		9	9		2					87
Farmer/hunter					1				2	6		9	2		8	6						9	85
Opportunity for hunting					3					5	9		3		4	5			3			8	83
Marketing premium								3		7	3	8	6		8	5		2					80
Business opportunities						2			4		8	2			8	6							64
Farmer image				5		3				8					9	8		1					60
Profit								1	4	8		8	8		8	7							59
Subsidy and grant eligibility				3	4					7	8		8		7	6							55
Cash flow										7	1				7	5							47
Tourism										6			4		7	8			5				40
Local food supply					5					8	2		10		9	9							37

Environmental effects: the negative effects of the system on the environment were not prioritised although two respondents gave “control of manure/noise/odour” and water quality” a ranking of 1.

Socio-economic effects: the negative aspects selected by the respondents were administrative burden, market risk, inheritance and tax, regulation. These aspects were extensively discussed during the open discussion session.

6. Questionnaire results: qualitative written responses

Eight respondents gave a written answer to the question “What key constraints or challenges could be addressed by changes to an existing agroforestry system?” In general, the comments matched those given orally during the open discussion, in which most participants gave their opinion. The topics involved the following:

- Tree mortality
- Difficulty to use certificated plants in afforestation
- Soil maintenance when implementing the agroforestry systems
- System design (spacing of the trees and mechanisation in the field)
- Abandonment of rural areas by young people
- Lack of financial support

Eight respondents gave written responses to “What kind of solutions or research themes would you propose?” The suggestions included the following:

- Production and availability of grafted plants
- Introduction of new products (mushroom, honey and medical plants)
- Training of rural people
- Dissemination of research through practical demonstration trials
- Study of irrigation effects on chestnut plantations

7. Next steps

Most of participants expressed their interest in participating in further meetings and in being informed about the progress/results of the project. According to the results obtained in the open discussion session and in the questionnaires, the group proposed two potential innovations:

- Graft production: production of grafted plants of selected varieties of chestnut by using the technique of micrografting, which permits production of a great number of these high demanded grafted plants in a very short term.
- Mushroom production: develop techniques to increase mushroom production in old stands

8. Reference

Crous-Duran, J., Amaral Paulo, J., Palma, J. (2014). Initial Stakeholder Meeting Report Montado in Portugal. Instituto Superior de Agronomia (ISA), Universidade de Lisboa, Portugal

9. Acknowledgements

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