

Work-package 3: Agroforestry for high value trees

Specific group: Intercropping of olive groves in Greece

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Location of meeting: Molos, Fthiotida, Central Greece

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The report contains additions and comments from team members.



Contents

1. Context.....	2
2. Description of system	2
3. Participants	2
4. Introduction session.....	3
5. Field visit	5
6. Positive and negative aspects of olive intercropping systems	5
7. Qualitative written and oral responses	7
8. Issues and challenges.....	8
9. Next steps	8
10. References	9
11. Acknowledgements.....	9



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

The combination of olive orchards with arable crops (cereals) in the same field is a traditional land use system in Central Greece (Figures 1 and 2). The combination of olives and cereals can stabilize the economic return in the context of variable weather conditions. This was the second of two meetings focused on such systems.



Fig 1. Map of Greece; red dot shows location of meeting



Fig 2. General photo of system

3. Participants

The initial meeting on 17 June 2014 was attended by 18 stakeholders and four presenters. Nine described themselves as farmers, one was manager of a farmers' association, two were educators, one retired, one farm worker, one economist, and three did not identify their occupation. Only eight participants completed a survey form. Concerning the age range of the participants, there were two aged 20-35, one aged 35-50, and four aged 50-65. Only one woman attended the meeting.

Of those who indicated that they were responsible for the management of a farm, only one characterized it as an agroforestry system. The stakeholders were all from the area. A lively conversation of two hours took place and many interesting issues were raised and discussed.



Figures 3 and 4. Photos of the group at the network meeting (22 people in attendance)

4. Introduction session

Dr. A. Pantera chaired the meeting and explained the meaning of agroforestry, the various agroforestry systems existing throughout Europe as well as the advantages and disadvantages of this land use system. She also introduced the AGRFORWARD project, its objectives, priorities, the concept of a participatory research and development network (PRDN), and the purpose of the meeting.

She made a short introduction on the benefits of intercropping trees with crops and the importance of listening to the opinion of stakeholders on this subject. She mentioned that agriculture has changed over the last decades. EU policy is currently directed to greener and more sustainable land use systems, which combine economic returns with protection of the environment. This could promote a change from monocultures to polycultures that also include woody species. Based on experimental results, the use of multiple species in the same land can result in higher income than monocultures, while simultaneously protecting the environment.

John Sarros (local TV reporter): raised many questions on agroforestry, the existence of agroforestry research results, the requirements and impact of the current common agricultural policy (CAP), the new practices required under the “greening” requirements of the new CAP. He felt that the traditional landscape of trees around the field borders had disappeared, replaced by tree-less monocultures. He commented on the problem of nitrification due to agricultural intensification. A major problem is the low water level caused by overexploitation in the region of Thessaly and also of Central Greece. This is partly due to farmers that grew high energy and water consuming crops such as cotton. He raised the issue of subsidies and suggested that much emphasis ought to be placed on product quality rather than quantity. He also mentioned that farmers have to put emphasis on exporting their products to other countries, taking into account the opportunities that add value to their products. Another issue raised was the use of aromatic plants to control pests.

Dr. Fotios Gravanis (agronomist-phytopathologist, invited speaker): explained that high density olive monocultures were becoming unviable due to the need to apply numerous applications of pesticides and this in turn created environmental problems. Agroforestry could help create a sound ecological balance enhancing biodiversity. Previous rounds of the CAP included environmental measures that were not, however, applied. CAP represents a framework within which all country-members have to apply their national policies. He felt that subsidies were not properly used in Greece: for example cotton was a high energy and water consuming plant which was often cultivated due to subsidies. However this in turn was leading to lower ground levels in Thessaly and Central Greece. Aromatic plants can be pest repellents and can be used as such in olive groves. Another option is intercropping with nitrogen fixing plants that are not water intensive, which could reverse soil degradation and increase soil nitrogen, whilst producing high quality products for human consumption and as feed. A large quantity of Greek-produced olive oil is exported abroad, bottled and packed and then re-imported.

Dr. G. Fotiadis said that there are many different plant species in Greece of which many were medicinal. Greek natural resources are characterized by high biodiversity. There are many opportunities for innovation (e.g. by co cultivation or use of thyme, clover and seed certification). For example, there are 40-50 different thyme species in Greece, at least 100 cloves, and he indicated that they all can be used for intercropping or ameliorating the soil, enhancing production. He also mentioned various crop species suitable for co-cultivation and the favourable opportunities offered by co cultivation to cope with fertilization and water problems.

Dr. A. Papadopoulos referred to the environmental dimension of the new CAP and to the environmental conditions that most farmers must cope with. He also referred to the problems that intensive agriculture caused in the lowland areas with soil and water resources as well as the erosion problems in hilly areas. He mentioned the desertification problems in several parts of Greece, as well as the possible impact of climate change on agricultural crops and natural ecosystems in general, highlighting the need to reconsider agricultural crops and natural ecosystems management under the scope of the new environmental data and the new CAP. Finally he pointed out the high economic and environmental value of the olive groves of the area and generally in the prefecture of Fthiotida and their development potential under the framework of an ecological agriculture.

Farmer 1 commented on the lack of information by state agencies to farmers. Farmers feel that the government is not supporting them. He suggested farmers should be self-organized and try to export their products. There are successful cooperatives in Crete and elsewhere. Product standardization can lead to profit. Another option is to sell their products to touristic enterprises.

Farmer 2 expressed his enthusiasm for the meeting and its importance in informing olive farmers of cutting-edge research on concepts such as agroforestry. They should be informed of pesticides application, and oil standardization to produce high quality oil. The local region has received awards for its high oil quality.

5. Field visit

The meeting took place close to the village of Molos, which is central to an area of olive groves. After the meeting the participants visited the olive grove of a farmer who has already intercropped between the trees. The farmer described his efforts and the results he has obtained so far. He emphasized the higher quality of his products which were mostly at an experimental small scale and for his own use. He cultivated some aromatic plants (as seen in Fig. 5) and some vegetables, such as peas, and cereals such as wheat.



Fig. 5. Photo from the field visit

6. Positive and negative aspects of olive intercropping systems

The participants were asked to complete a brief questionnaire which sought to highlight what they thought as the key positive and negative aspects of olive intercropping systems. Eight participants completed the form. However there appeared to be inconsistencies in the results; the results for six participants who gave consistent results is presented in Table 2. At the Portuguese Montado meeting, Crous-Duran *et al* (2014) used the scoring system in Table 1 to get an overall ranking. Twenty-five points were given to the item ranked first and one point to the item ranked tenth. For each item, the points were added and the total points indicated the overall assessment in terms of positive and negative aspects of agroforestry: Table 2 (positive) and Table 3 (negative).

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: the most positive aspects were animal health and welfare, control of manure/noise/odour, tree production (in this case: olives), biodiversity and wildlife habitat and animal production, biodiversity and wildlife habitat (Table 2). Other highly ranked issues were the inspection of animals and landscape aesthetics; the general environment also ranked highly. There were similar findings from the stakeholder meeting on olive groves in N. Greece.

Table 2. Positive aspects of the agroforestry system as ranked by six respondents. None that some respondents gave different aspects the same ranking.

Aspect	Ranking by six respondents						Summary
Animal health and welfare	1	1	3	1		1	115
Control of manure/noise/odour	1	1	3		1	1	115
Timber/wood/fruit/nut production	1	1			1	1	100
Biodiversity and wildlife habitat	1			2	1	1	93
Animal production	1	2	1			1	93
General environment	1		2		1	1	93
Carbon sequestration	1		3		1	1	90
Landscape aesthetics	1		4		1	1	87
Inspection of animals	2	1		4		1	80
Climate moderation	2		4		1	1	80
Disease and weed control	4		2		1	1	80
Originality and interest	2		6		1	1	76
Soil conservation	1		2			1	68
Crop or pasture quality/food safety	1		3			1	65
Management costs	4	1				1	62
Diversity of products	1		4			1	62
Income diversity	4	1	5			3	62
Reduced groundwater recharge	2		2			1	61
Change in fire risk	1				5	1	60
Timber/wood/fruit/nut quality	2			3		1	58
Crop or pasture production	4		2			1	55
Water quality	2		2			2	54
Farmer image	2				3	2	51
Project feasibility					1	1	50
Runoff and flood control	1					1	50
Mechanisation	3					1	40
Tree regeneration/survival			3			1	40
Complexity of work	4					1	37
Labour	4					1	37
Profit		1	4				37
Losses by predation			5			1	35
Opportunity for hunting			5		1		35
Relationship between farmer/hunter			5			1	35
Administrative burden	4		9			3	29
Relationship between farmer/owner			5			2	28
Subsidy and grant eligibility			6			3	23
Tourism					5	5	20
Business opportunities						2	18
Cash flow						4	12
Market risk			8				4

Negative aspects: the most negative issue was the losses by predation, inspection of animals (sheep), and the opportunity for hunting (Table 3). The other issues, which were identified as negative aspects, were also mentioned during the discussion. There were a range of negative factors identified with most respondents indicating the complexity of work was a significant factor. Mechanization, among others, was also mentioned as negative.

Table 3. Ranking of negative aspects of olive intercropping system as perceived by eight respondents

Aspect	Ranking by respondents					Score	Summary
Losses by predation	1	1	2			68	2 x 1st, 1 x 2nd
Opportunity for hunting	5			1		35	1 x 1st, 1 x 5th
Inspection of animals		1				25	1 x 1st
Relationship between farmer/hunter	5			2		28	1 x 2nd, 1 x 5th
Cash flow					3	15	1 x 3rd
Complexity of work			6		5	18	1 x 5th, 1 x 6th
Tourism	5		8			14	1 x 5th, 1 x 8th
Labour					5	10	1 x 5th
Management costs					5	10	1 x 5th
Tree regeneration/survival					5	10	1 x 5th
Inheritance and tax	7					6	1 x 7th
Regulation	7					6	1 x 7th
Mechanisation			8			4	1 x 8th



Figures 6 and 7: Photos from the meeting

7. Qualitative written and oral responses

Only two participants provided written responses. One commented that the eggs produced from chickens grazing in olive orchards had a distinctly better taste than others. The other asked to be informed of future actions from the project.

8. Issues and challenges

In the discussion that followed, the group identified the key issues and challenges that were related to agroforestry. The following four key topics and subtopics were identified:

1. Intercropping

- Do we want trees inside the agricultural area or not?
- If we decide to intercrop, which crop species should we use?
- Co-cultivation with aromatic herbs may positively affect oil quality and flavour. Thyme, oregano or *Origanum dictamnus* to intercrop?
- Vegetables should be excluded as intercrops.

2. Pesticides

- Do aromatic herbs act as pest repellents? To which insects? To the number of insects?
- There can only be co-cultivation for trees to produce oil and not edible olives since a high number of pesticides are applied in the latter.
- What is the effect of pesticide applications (sprays) to olive-trees/intercropped species?

3. Products quality

- Co-cultivation of olive trees with figs enhances olive quality
- There are no organic olive cultivation in the area

4. Cultivation-production techniques

- Does shading affect crop production?
- What is the effect of living fences (mostly of cypress trees) to production? Orientation of the fences?
- Farmers should be self-organised, products should be accurately priced

Current examples of interesting or best practice

In terms of the intercropping, the group identified the current examples of interesting or best practice: trees intercropped with aromatic/medicinal herbs, leguminous plants for soil amelioration, and higher quality products for human consumption or for feed.

Potential innovations looking forward

Looking forward, the group proposed as potential innovation to investigate new intercrops with aromatic plants or legumes

9. Next steps

Two farmers positively answered to the question posed by Dr. Pantera on the possibility of collaborating with the AGFORWARD team on the experiments to be conducted in the area. Seven of the participants expressed their wish to participate again in any future meeting, and all expressed their will to be informed of the progress/results of the project. From the AGFORWARD project perspective, the plan is to identify such researchable topics before the end of 2014.

10. References

AGFORWARD (2014). Agforward website. www.agforward.eu

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

11. Acknowledgements

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The meeting was broadcast over a local TV station, accessible at:

http://webtv.lamiastar.gr/index.php?view=videos&video_id=1403847423