

Work-package 3: Agroforestry for high value trees

Specific group: Co-cultivation of olive groves with arable crops

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Location of meeting: Kassandreaia, Chalkidiki, Macedonia, Greece

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The report contains additions and comments from team members.



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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

In Chalkidiki, in northern Greece, farmers have historically combined olive production with arable crops (cereals) in the same plot (Figures 1 and 2). This ensures a steady economic return each year irrespective of weather conditions or other hazards. Although olive groves are mainly grown as monocultures there are still farms which combine olive trees with cereals.

The AGFORWARD network meeting attempted to bring a number of farmers and other stakeholders with a potential interest in the co-cultivation of olive trees with arable crops.



Figure 1. Map of Greece; red dot shows location of system



Figure 2. General photo of system

3. Participants

The initial meeting was attended by 14 stakeholders and four presenters. Twelve described themselves as farmers and six were scientists (agronomists and foresters). Twelve participants completed a survey form. There was a broad age range with two aged 20-35, four aged 35-50, three aged 50-65 and one over 65 years old. One participant did not identify his age.

Eight answered that they were responsible for the management of olive farms, but only two were aware of agroforestry. There were two women among the attendees. The stakeholders were all from the area. A lively conversation of two hours took place and many interesting issues were raised and discussed. All participants expressed their wish to participate in any other future meeting, and to be informed of the progress/results of the project.



Figure 3. Photo of the group. The network meeting was attended by 18 people

4. Introduction session

Dr. A. Pantera (Scientific Responsible) provided an overview of the AGFORWARD project. She 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 AGFORWARD, the network involved, its objectives, priorities, the concept of a participatory research and development network (PRDN), and the purpose of the meeting (AGFORWARD, 2014).

Dr. V. Papanastasis chaired the meeting and provided a short presentation on why trees should be co-cultivated with crops on arable land, noting the importance of listening to the opinion of stakeholders on this subject. He mentioned that agriculture has changed over recent decades. EU policy is currently directed to greener and more sustainable land use systems, which combine economic returns with protection of the environment. He explained that this would 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. He also explained that olive monocultures, with trees at high densities and application of numerous pesticides as well as frequent sowing, is not viable due to its high cost and the environmental problems that are caused.

Dr. G. Fotiadis said that there are at least 7500 different plant species in Greece, and many are aromatic or have potential medicinal uses. Greek natural resources are characterized by their high biodiversity and this should be a focus for investment. There are many opportunities for innovation e.g. by co cultivation or use of thyme, clover and seed certification. He also mentioned various crop species suitable for co-cultivation and the favorable opportunities offered by co-cultivation to cope with the leaching of nutrients to water courses.

Dr. A. Papadopoulos explained that there is an environmental dimension in the new common agricultural policy (CAP) to cope with problems such as desertification, often linked to intensive practices in agriculture. Another problem is the very small landownership in Greece, compared with other European countries, made intensive agriculture unsustainable. In this context, agroforestry may contribute to the farmer's income and to that of the country in general, particularly in degraded areas with steep slopes. Climate change is a reality and has become more obvious with the warmer winter temperatures and the intensive weather events over the last decades, negatively affecting plant growth due to reduced water availability. Consequently, in an area like Greece, agricultural area and production are expected to deteriorate.

Dr. K. Mantzanas commented on the positive effects of agroforestry and its use in organic olive groves.

5. Field visit

The meeting took place in the village of Kassandreia which is located at the centre of an olive grove area, so no field trip was necessary as most participants were aware of the system.

6. Positive and negative aspects of olive silvoarable systems

The participants were asked to complete a brief questionnaire which sought to highlight the key positive and negative aspects of olive silvoarable systems (Graves et al. 2009). Twelve participants completed the form in a consistent way; one only made comments. At this meeting, the participants ranked different aspects with the same ranking. 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 the quality of the tree products (in this case the olives), biodiversity and wildlife habitat, soil conservation and the diversity of products. The general environment, originality and interest, tree production (e.g. olives), landscape aesthetics, and crop and pasture production also ranked highly. Compared to some other stakeholders meetings, the participants positively ranked many environmental issues. It was the only meeting where tourism ranked high (Table 2).

Negative aspects: the most negative issues were the management costs and the administrative burden. The complexity of work, mechanization, losses by predation and changes in fire risk were also ranked highly as negative factors. Inheritance and tax, reduced groundwater recharge, and the marketing premium were also raised as issues (Table 3).

Table 3. Negative aspects of an olive silvoarable system, as ranked by twelve respondents. Note that in this meeting, the respondents gave the same ranking to different aspects. The summary score is based on the point system in Table 1.

Aspect	Ranking by twelve respondents											Summary		
Management costs		2		1		2				6		2	2	105
Administrative burden				1	4	3						1	1	102
Complexity of work	1			3		5				5		2	2	96
Mechanisation		1		2						8		3	3	77
Losses by predation				2								1	1	68
Change in fire risk					3	3						2	2	66
Inheritance and tax				2	10	1		3						59
Disease and weed control				2		5						3	3	58
Labour				2						7		3	3	54
Reduced groundwater recharge												1	1	50
Inspection of animals				2		5			3	7				49
Market risk				2	4	6								38
Relationship between farmer/hunter				2	2									36
Relationship between farmer/owner				2	2									36
Cash flow				2	9	3								35
Carbon sequestration					3	3								30
Marketing premium					8			1						29
Regulation					6	2								26
Timber/wood/fruit/nut production	2													18
Climate moderation					2									18
Business opportunities					2									18
Originality and interest					3									15
Soil conservation					3									15
Subsidy and grant eligibility						3								15
Control of manure/noise/odour					4									12
Landscape aesthetics					4									12
Farmer image					4									12
Opportunity for hunting					4									12
Profit					4									12
Water quality					5									10
Project feasibility					8									4
Income diversity					8									4

7. Qualitative written responses

Four participants also gave written comments on the benefits and constraints of the agroforestry system. They thought that this could be a good way to reduce weeds, but also to reduce management costs through combined operations. Mechanization and proper plant combination were identified as challenging issues. One participant identified 12 m as the traditional spacing between olive trees and suggested that orchards for edible olives should be fertilized only by the use of green manure. He also commented that in the area of Kassandrino, the companion plant could include peas or vetches whereas in the area of Kriopigi it could be oregano.

8. Key issues and challenges

In the discussions at the meeting, the group identified the key issues and challenges that were related to agroforestry. Nine key topics were identified:

1. If we want crops under the olive trees or not?
2. If we decide to intercrop, which crop species should we use?
3. If intercrops should be restricted to farms which produce olive oil, and not edible olives, since a high number of pesticides are applied in the latter.
4. If intercrops with aromatic herbs affect oil quality and flavour.
5. If co-cultivation of olive trees with fig and almond trees or poppies positively affect olives as they attract *Bactrocera oleae*, which favours olives.
6. When is the best time for pruning? Caution must be taken not to transmit diseases by the use of unclean equipment. Debris should be burnt for this purpose.
7. If shading affects crop production?
8. If vegetables should be excluded as intercrops.
9. If economic incentives would help the introduction of crops in olive groves.

Current examples of interesting or best practice

In terms of the intercropping, the group identified intercropping with leguminous plants for soil amelioration or cereals for grain production as interesting or best practices. A traditional practice that was mentioned was the intercropping of peas, bitter vetch and vetch for feed (early cut) and wheat. The tree spacing was 12 m x 12 m. Looking forward, the group proposed as potential innovation to investigate new intercrops with aromatic plants, legumes or cereals.

9. Farmers willing to participate in the research

Two farmers positively answered to the question posed by Dr. Pantera on the possibility to cooperate with the AGFORWARD team on the experiments to be conducted in the area. From the AGFORWARD project perspective, the plan was to identify such researchable issues before the end of 2014.

10. References

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