

Work-package 3: Agroforestry for high value trees

Specific group: Intercropping of walnut trees with arable crops in 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 Eurytania, central Greece (Figure 1), farmers have traditionally integrated agricultural production with high value tree species such as walnut and chestnut on the same plot (Figure 2). In this way they have ensured a steady economic return under variable weather conditions. The area is characterized by walnut trees growing at the edge of fields of maize, dry beans, cereals and pasture.



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



Figure 2. General photo of system

3. Participants

The initial meeting on 29 May 2014 was attended by 19 stakeholders and three presenters. Sixteen described themselves as farmers, one was a student, one was a public servant, and one was unemployed. Eight participants completed a survey form: of these four were 35-50 years-old, three were 50-65 and one was over 65 years-old. Five women attended the meeting.

Only two of those who completed the survey characterized their farm as an agroforestry system. All stakeholders were from the local area. A lively conversation of two hours took place and several

interesting issues were raised and discussed. The meeting took place in the village of Klafsi where the system is popular so no field trip took place.



Figure 3. Photo of the group at the network meeting (22 people in attendance)

4. Introduction session

Dr. A. Pantera (Scientific Responsible) chaired the meeting and made a short introduction on the benefits of cultivating crops between trees and the importance of listening to the opinion of stakeholders. She explained the meaning of agroforestry and the various agroforestry systems existing throughout Europe. She also introduced AGRFORWARD, its objectives, priorities, and the purpose of the meeting. She mentioned that EU policy is currently directed to greener and more sustainable land use systems which combine economic returns with protection of the environment. This may encourage a change from monocultures to polycultures that include woody species.

Dr. G. Fotiadis said that there are at least 1200 plant species on the nearby Mount Timfristos, some of them rare (more than 100 species are protected while almost 36 are endemic to Greece and 2 are local endemic species). Many of the species have medicinal uses. It was noted that Greek farmers would find it difficult to compete against other large European countries in terms of product quantity but there were opportunities in terms of product quality, organic production, and new products focused on local medicinal or aromatic plants. Agroforestry can offer benefits with trees being capable of capturing the unused nitrogen of the fertilizers applied to crops. There are also benefits from the high biodiversity of agroforestry systems.

Dr. A. Papadopoulos mentioned the traditional agroforestry systems where trees were intercropped with cereals or vegetables, used to sustain local economy at a family or small farm scale, which were abandoned but regain interest due to the present economic crisis in Greece. These abandoned AF systems can be easily reused with economic returns since there are still the old traditional cultivations infrastructures, the knowledge about the cultivation of these fields and the increasing demand for local products. In the surrounding area it seems that there has been increased interest in the restoration of the culture of these agroforestry systems with walnut, chestnut and other tree

species that can thrive in the region. A key issue raised for the restoration of these traditional crops is the irrigation of the fields. Here we should stress on the necessity to maintain the old irrigation network channels that exist in the region, which are fed by many regional streams. Furthermore another significant problem in the region, and throughout the mountainous Greece, is the afforestation of abandoned fields and the risk of being characterized by the Forest Service as a forest. Note that these systems in this region, but also in other mountain regions of Greece, have specific characteristics such as steep slopes (terrace cultivation), the presence of forest vegetation, the risk of erosion, and the size of the fields. An important issue is the very small landownership in Greece compared with other European countries. Agroforestry may contribute to the farmer's income and to the country's in general, especially in degraded areas with steep slopes. The presence of these systems in hilly and mountainous area of Greece is particularly interesting if one takes into account the environmental dimension in the new CAP, which tries to combine agricultural production and conservation and environmental protection. These systems which, combined with the high touristic interest of the area, may maximize the economic income of the farmers providing high quality touristic product e.g. eco-tourism, agro-tourism. Finally, the reconstitution of these systems beyond economic benefits will contribute to maintaining the area of the local population and returning to their place of young farmers who want to engage in agriculture and rural tourism.

5. Positive and negative aspects of olive intercropping systems

At the Portuguese stakeholder 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

The participants were asked to complete a brief questionnaire which sought to highlight what they thought as the key positive and negative aspects of the walnut intercropping systems. Eight participants completed the form.

Positive aspects: the most positive aspect was the diversity of products provided by the system (Table 2). It must be noted that these systems provide a wide diversity of products including walnuts, timber, maize, vegetables, and beans. Other highly ranked issues were the general environment and landscape aesthetics. Recently, the area is becoming a touristic destination and hence conservation of the environment has become financially more important to local people. Improved water quality is also considered important. Animal health also featured high as most farmers have livestock which are allowed to graze in the fields after harvest (Figure 2).

Table 2. Positive aspects of the agroforestry system as ranked by eight respondents

Aspect	Ranking by eight respondents								Σ
Diversity of products	2	1	1	1	1	1	1	1	193
General environment	1	1	1	1	1	2	2	4	173
Landscape aesthetics	1	1	1	1	1	2	2	4	173
Timber/wood/fruit/nut production	2	3	4	1	1	1	1	1	170
Water quality	3	3	4	3	2	2	2	1	166
Crop or pasture quality/food safety	2	3	2	2	2	1	1	1	162
Climate moderation	1	1	2	1	1	3	3	4	160
Animal health and welfare	2	3	1	3	2	1	1	2	159
Carbon sequestration	1	1	1	1	1	4	4	5	159
Animal production	2	3	1	3	2	1	1	3	156
Timber/wood/fruit/nut quality	2	3	3	3	2	1	1	1	156
Disease and weed control	3	2	4	3	3	1	1	1	150
Inspection of animals	2	1	3	1	1	4	4	3	147
Soil conservation	2	2	1	2	1	4	4	2	146
Runoff and flood control	3	1	1	1	1	5	5	6	143
Losses by predation	3	5	5	3	4	1	1	4	136
Reduced groundwater recharge	2	2	2	1	1	5	5	5	134
Biodiversity and wildlife habitat	2	3	2	2	2	3	3	3	132
Crop or pasture production	3	6	2	4	5	1	1	2	131
Tree regeneration/survival	4	5	2	4	5	1	1	3	127
Change in fire risk	3	2	1	3	2	4	4	5	125
Control of manure/noise/odour	2	4	2	2	3	4	4	6	113
Local food supply	3	3	7	4	3	3	3	3	108
Opportunity for hunting	2	4	4	3	5	4	4	6	99
Complexity of work	5	5	5	5	5	3	3	4	92
Rural employment	6	7	7	6	5	2	2	4	86
Income diversity	5	4	4	5	5	5	5	5	84
Farmer image	6	5	7	8	7	3	3	4	76
Relationship between farmer/owner	6	5	6	5	5	3	3	7	76
Labour	7	8	6	8	8	2	2	5	72
Management costs	6	5	5	6	7	5	5	5	72
Mechanisation	5	5	5	5	5	6	6	7	72
Originality and interest	4	6	4	7	7	5	5	6	72
Project feasibility	5	5	4	6	5	7	7	6	70
Relationship between farmer/hunter	5	7	6	5	6	7	7	4	66
Inheritance and tax	7	5	9	6	5	6	6	4	64
Regulation	6	5	8	6	5	7	7	6	60
Administrative burden	7	6	5	7	6	7	7	6	58
Tourism	4	4	4	5	4				58
Market risk	8	5	8	8	5	7	7	7	50
Profit	7	5	8	7	7	7	7	8	48
Subsidy and grant eligibility	8	7	9	7	5	7	7	7	46
Marketing premium	8	8	9	8	8	6	6	5	44
Cash flow	8	7	9	9	9	6	6	7	38
Business opportunities	8	7	8	9	9	7	7	7	36

Table 3. Ranking of negative aspects perceived by eight respondents

Aspect	Ranking by eight respondents								Σ
Cash flow	2	3	1	1	1	6	5	7	132
Marketing premium	2	2	1	2	2	5	4	5	129
Business opportunities	2	3	2	1	1	7	6	6	123
Inheritance and tax	3	5	1	4	5	5	4	3	109
Regulation	4	5	2	4	5	3	3	4	104
Farmer image	4	5	3	2	3	5	6	5	98
Subsidy and grant eligibility	2	3	1	3	5	9	7	7	97
Labour	3	2	4	2	2	9	8	6	93
Relationship between farmer/hunter	5	3	4	5	2	5	7	6	89
Administrative burden	3	4	5	3	4	7	6	5	88
Management costs	4	5	5	4	3	7	5	5	85
Originality and interest	6	4	6	3	3	5	7	6	82
Market risk	2	5	2	2	5	6	5	6	82
Profit	3	5	2	3	7	8	7	7	80
Rural employment	4	3	3	4	5	6	7	7	80
Mechanisation	5	5	5	5	5	6	5	5	78
Project feasibility	5	5	6	4	5	6	5	5	78
Income diversity	5	6	6	5	5	5	5	4	78
Relationship between farmer/owner	4	5	4	5	5	5	7	8	74
Complexity of work	5	5	5	5	5	6	6	7	72
Local food supply	7	7	3	6	7	7	5	5	67
Opportunity for hunting	8	6	6	7	5	7	4	5	64
Tree regeneration/survival	6	5	8	6	5	5	8	7	60
Losses by predation	7	5	5	7	6	8	7	9	52
Crop or pasture production	7	4	8	6	5	8	8	8	52
Biodiversity and wildlife habitat	8	7	8	8	8	5	5	6	50
Control of manure/noise/odour	8	6	8	8	7	7	6	7	46
Reduced groundwater recharge	8	8	8	9	9	5	5	5	46
Change in fire risk	7	8	9	7	8	7	5	7	44
Runoff and flood control	7	9	9	9	9	5	5	5	44
Tourism			6			5	3	5	43
Disease and weed control	7	8	6	7	7	8	9	8	40
Water quality	7	7	6	7	8	9	8	8	40
Timber/wood/fruit/nut production	8	7	6	9	9	7	7	8	38
Soil conservation	8	8	9	8	9	6	7	7	36
Inspection of animals	8	9	7	9	9	7	8	6	34
Animal health and welfare	8	7	9	7	8	9	8	8	32
Animal production	8	7	9	7	8	9	9	7	32
Crop or pasture quality/food safety	8	7	8	8	8	9	8	8	32
Timber/wood/fruit/nut quality	8	7	7	7	8	9	9	9	32
Carbon sequestration	9	9	9	9	9	6	6	7	32
Landscape aesthetics	9	9	9	9	9	8	8	6	26
Diversity of products	8	9	9	9	9	8	7	9	24
Climate moderation	9	9	8	9	9	8	8	8	24
General environment	9	9	9	9	9	8	9	7	22

Negative aspects: the most negative issue was the low cash flow from an agroforestry system (Table 3). Generally, the small land area per property is not sufficient for high income, especially in this region where the growing season is short. Respondents also thought that there are low marketing and business opportunities. Recently, the Greek government has increased land and inheritance taxes and this has caused major concern to many people. Tight regulations concerning land use and management procedures posed by the government represent another obstacle to farmers. It is worth mentioning that farmer image is a major issue throughout the country and not only in the specific area. Arable and livestock farming is not a popular occupation among young people. The lack of sufficient subsidies, that could contribute to overcome the problem of low cash flow from the system, is another negative issue for the farmers.

In terms of the written issues on the survey form and in the discussion the most common problem was the wish of the participants on opening-maintaining the traditional water channels and the indifference of local authorities. Another problem raised by all participants was the low walnut production for the past five years.



Figures 4 & 5. More pictures from the meeting and the system

6. Issues and challenges

In the discussion that followed, the group identified the key issues and challenges that were related to agroforestry in response to six questions:

1. Do we want trees inside the agricultural area or not?
2. If we decide to intercrop, which tree species should we use? And what crop? What trees to plant and with which crop?
3. What about plots which are not cultivated by the owners but by other farmers who rent them?
4. Does shadow affects crop production?
5. How can walnut production increase? Is the low production due to climate change? Is there any way to counteract this problem?
6. Would economic incentives help the introduction of trees in arable crops?

7. Best practice, innovations and next steps

In terms of the intercropping, the group identified the current examples of interesting or best practice:

1. Trees can be combined with aromatic/medicinal plants
2. Trees can be planted in larger spacing in order to allow the growth of understory crop species
3. Old traditional practice which combined trees with legumes (pulses)

Looking forward, the group proposed as potential innovation to investigate new intercrops with aromatic/medicinal plants or pulses.

8. References

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

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9. Acknowledgements

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