AGFORWARD: ACHIEVEMENTS DURING THE FIRST TWO YEARS

Burgess PJ[1], den Herder M[2], Dupraz C[3], Garnett K[1], Graves AR[1], Hermansen J[4], Liagre F[5], Mirck J[6], Moreno G[7], Mosquera-Losada MR[8], Palma JHN[9], Pantera A[10], Plieninger T[11]

*Correspondence author: P.Burgess@cranfield.ac.uk

(1) Cranfield University, Cranfield, Bedfordshire, MK43 0AL, United Kingdom; (2) European Forest Institute, Yliopistokatu 6, FI-80100 Joensuu, Finland; (3) INRA, UMR SYSTEM, 2, Place Viala, 34060 Montpellier Cedex 1, France; (4) Aarhus University, Blichers Allé 20, 8830 Tjele, Denmark; (5) AGROOF SCOP, 9 plan de Brie, 30140 Anduze, France; (6) Brandenburg Technical University Cottbus – Senftenberg, 03046 Cottbus, Germany; (7) Universidad de Extremadura, Spain; (8) Universidad de Santiago de Compostela, 27002 Lugo, Spain; (9) University of Lisbon, Portugal; (10) TEI of Central Greece, 36100 Karpenissi, Greece; (11) University of Copenhagen, Rolighedsvej 23, 1958 Frederiksberg C, Denmark

Introduction, aims and objectives

AGFORWARD is a major European agroforestry research project co-funded by the European Commission under its 7th Framework Programme. The four year project, which started in January 2016, involves 26 partners from across Europe. The purpose of this short paper is to describe the aim and the objectives of the project, and to describe some of the key achievements during the first two years. A full progress report for the first 12 months is provided by Burgess et al. (2015).

The overall aim of the project is to promote AGroFORrestry practices in Europe that Will Advance Rural Development. Agroforestry is defined as the practice of deliberately integrating woody vegetation (trees or shrubs) with crop and/or animal systems to benefit from the resulting ecological and economic interactions. The project has four objectives which are addressed through ten work packages (**Figure 1**):

1. To understand the **context** and extent of agroforestry in Europe (work package 1).
2. To **identify, develop and field-test** agroforestry innovations (work packages 2, 3, 4 and 5).
3. To **evaluate** innovative agroforestry practices at field-, farm- and landscape scales (work packages 6 and 7).
4. To **promote** appropriate agroforestry through policy development and dissemination (work packages 8 and 9).

There is also a project management activity (work-package 10).

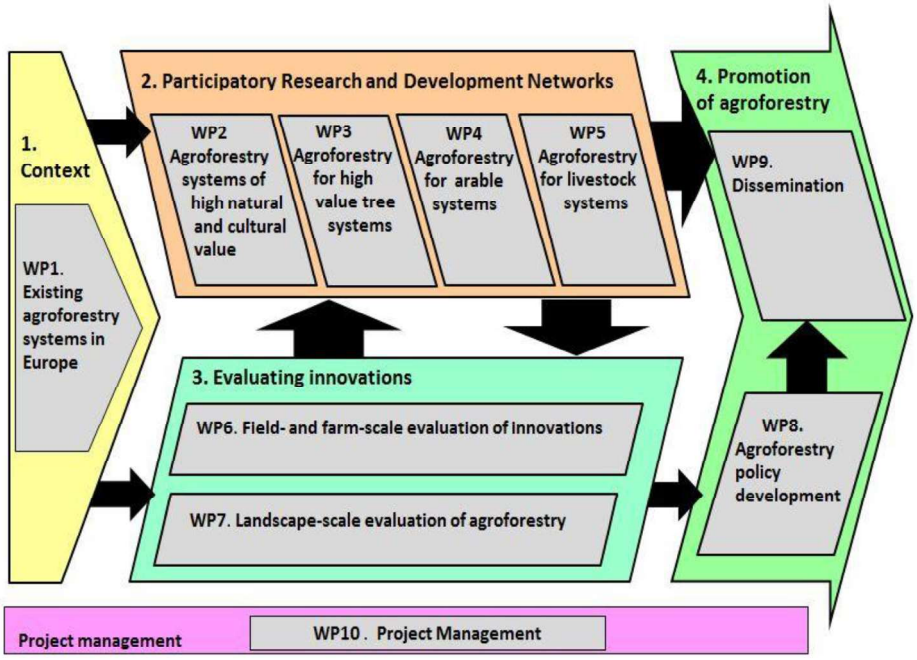

Figure 1: Schematic diagram showing the key components of the AGFORWARD project

Objective 1: Context of agroforestry

In the first year, AGFORWARD produced a report on agroforestry in Mediterranean areas bordering Europe (Pagella et al. 2014). A climate analogue approach was used to look at

potential climates for four existing dehesa sites in Spain. The predicted climate in 2050 and 2080 for some of the dehesa sites was predicted to resemble the current climate in some areas in Morocco.

During the second year two reports have been produced on the context and extent of European agroforestry. The report by den Herder et al. (2015a) used existing literature to estimate an area of agroforestry in Europe in excess of 6.5 million hectares. This has been followed a report, primarily using the LUCAS Land Use and Coverage Area frame Survey dataset, to identify the proportion of land combining the use of trees and farming. This analysis suggests an agroforestry area of about 24 million ha equivalent to 5.7% of the land area of Europe (den Herder et al., 2015b). This is a larger estimate than the initial literature review. The higher value is a result of adding data for Romania (+1.76 million ha) and Bulgaria (+1.39 million ha), plus higher estimates for Spain (+3.05 million ha), France (+2.12 million ha) and Italy (+1.34 million ha). The higher estimate for Spain is supported by a review of national data and is primarily a result of including silvopastoral systems in addition to the dehesa.

Objective 2: Identify, develop and field-test agroforestry innovations

The second objective of the project is to identify, develop, and field-test agroforestry innovations and this is being achieved through four participatory research and development networks (**Figure 2**). These networks focus on:

- Existing agroforestry systems of high nature and cultural value such as the dehesa and montado systems in Spain and Portugal, and other European wood-pastures (work-package 2).
- The integration of grazing or intercropping in high value tree systems including olives, fruit trees, and walnut and chestnut grown for high value timber (work-package 3).
- The integration of trees in arable systems (work-package 4).
- The integration of trees in livestock systems (work-package 5).

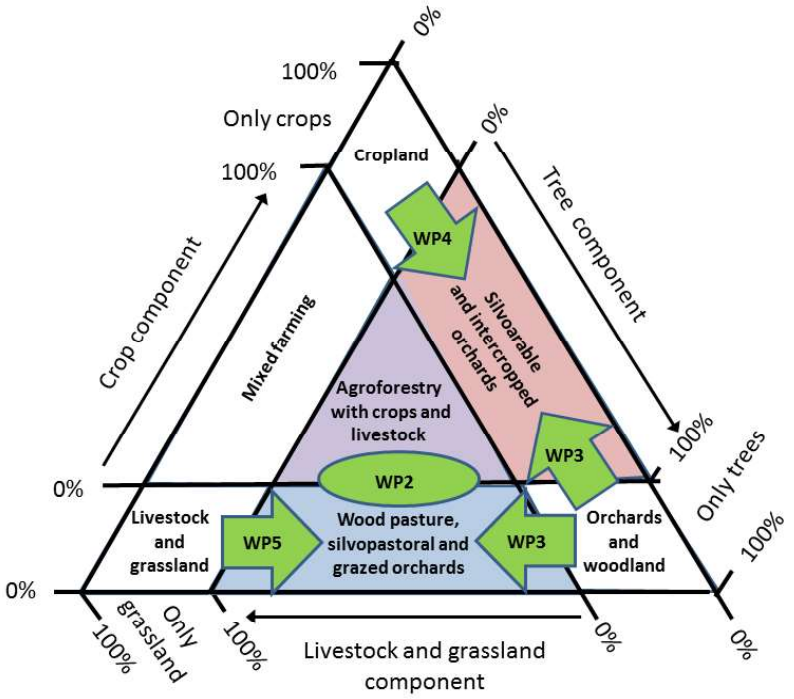

Figure 2: AGFORWARD focuses on identifying opportunities to benefit from integrating trees with livestock and/or crops. The participative work-packages focus on different starting points.

During 2014, the AGFORWARD project established 42 stakeholder groups involving about 820 stakeholders with different agroforestry practices across 13 European countries. The facilitator of each group has written an initial stakeholder report describing the agroforestry practice and the key positive and negative aspects as perceived by farmers and other stakeholders. These are all available on the AGFORWARD website: www.agforward.eu. The full analysis is still on-going but it appears that the production, environmental, and societal benefits of agroforestry are generally well recognised. The key negative issues often revolve around management, administration, labour costs, and issues of complexity.

At the beginning of 2015, each of the four participative research and development networks produced a list of innovations to be investigated during the remaining three years of the project

(Moreno et al. 2015a; Pantera et al. 2015a, Mirck et al. 2015, Hermansen et al. 2015). Sharing existing knowledge and tree regeneration and protection were recognised as priorities within work-packages 2, 4 and 5. Livestock management (including the use of GPS and "invisible fencing") and securing a premium price for agroforestry products were also highlighted in work-package 2. The use of sheep in apple orchards is the focus of three groups in work-package 3, and has synergies with work-package 5. Work-package 3 also focused on the intercropping and grazing of olive or citrus orchards in four groups. Weed management near trees was highlighted in work-package 4, and system design and the nutritional value of woody vegetation were highlighted issues in work-package 5.
During 2015, detailed research protocols were developed for each of the 40 stakeholder groups and a synthesis of these were provided for each participative and development network (Moreno et al. 2015b; Pantera et al. 2015b, Mirck and Burgess 2015, Hermansen 2015). During early 2016, some of the initial results are being made available on-line and some of the results are presented in these Conference proceedings.

Objective 3: Evaluate innovative agroforestry at field-, farm- and landscape-scales
Whilst some evaluation will be completed in the field, because tree responses can take years, if not decades, we are also making use of bio-economic models. It is unlikely that a single model can be used to evaluate all systems, and hence we are using a suite of models and approaches. For the evaluation of the effect of agroforestry innovations at a field- and a farm-scale (work-package 6) we are developing the Yield-SAFE, Farm-SAFE and Hi-sAFe models used in a previous European agroforestry project. A climate database called "Clipick" for use in the modelling work has been made available on the AGFORWARD website (Palma 2015), and an on-line version of Yield-SAFE should be available in 2016.
The landscape-scale analysis (work-package 7) has completed a systematic literature review of the effects of agroforestry on ecosystem services (Fagerholm et al 2016). To determine the effects of agroforestry at a landscape scale, 12 sample sites have been identified comprising a 3 x 4 matrix across three agro-ecological zones (Mediterranean, Atlantic, and Continental) and the agroforestry practices described in Figures 1 and 2. The experimental protocols were piloted in Spain and in Switzerland during 2015, and are now being extended to the other sites.

Objective 4: Policy development and dissemination
Objective 4 of promoting agroforestry is focused on policy development (work-package 8) and dissemination activities (work-package 9). A report evaluating agroforestry-related policies within the 2007-2013 Common Agricultural Policy and the associated rural development programmes should be available on the AGFORWARD website in early 2016. A key member of the AGFORWARD consortium is the European Agroforestry Federation (EURAF). EURAF are playing a key role in both promoting agroforestry within selected Civil Dialogue Groups of the European Commission, but in supporting national agroforestry associations across Europe.
Dissemination has been a key focus of activity during the first 24 months of the project; it is not something left to the final year. We hope that the AGFORWARD project website (www.agforward.eu) is a particularly useful resource. The key webpages are available in 11 languages, and we hope to make Polish available soon. The website hosts an individual web-page for each of the 42 stakeholder groups, and a map of national agroforestry associations. The news page of the website has been updated monthly. There is also an interactive on-line European map including each agroforestry stakeholder group. The project also has its own active Facebook page (https://www.facebook.com/AgforwardProject) and quarterly electronic newsletters have also been circulated to 500 people across Europe with a demonstrated interest in agroforestry.

Conclusions
During the first two years, we believe that the AGFORWARD project has created real regional synergies between many farmers, landowners, researchers, and extension advisors to promote agroforestry. We also believe that the project increasingly provides a resource for policy makers and others to identify, encourage and promote the use of agroforestry in those areas where it provides agricultural, environmental and societal benefits.

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