

# The AGFORWARD project

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12 September 2015

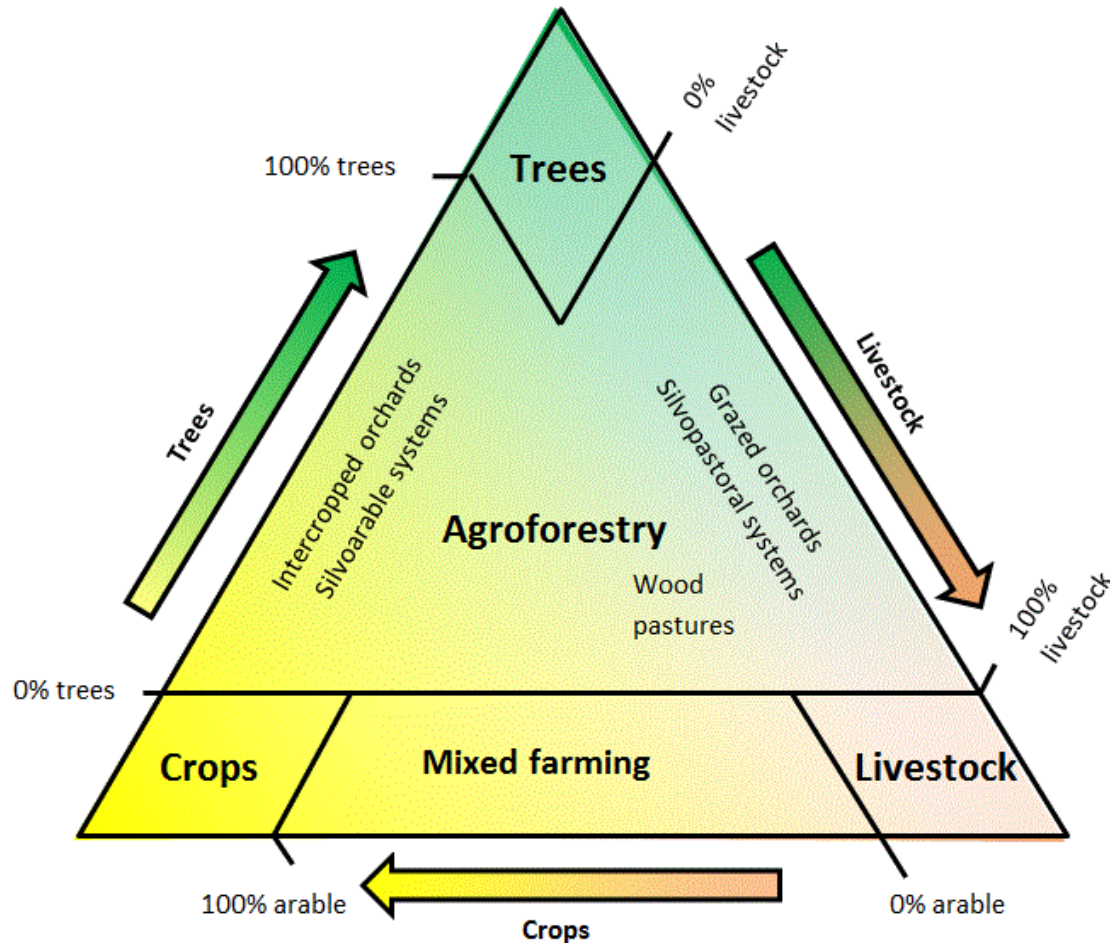
Presentation at Agroforestry Event at EXPO2015:

Agroforestry: Sustainably Feeding the Planet and Providing Energy



European Union's Seventh Framework Program for research, technological development and demonstration under grant agreement no 613520

# The Aim



Aim: To promote **AGroFORestry** practices in Europe that **Will Advance Rural Development**



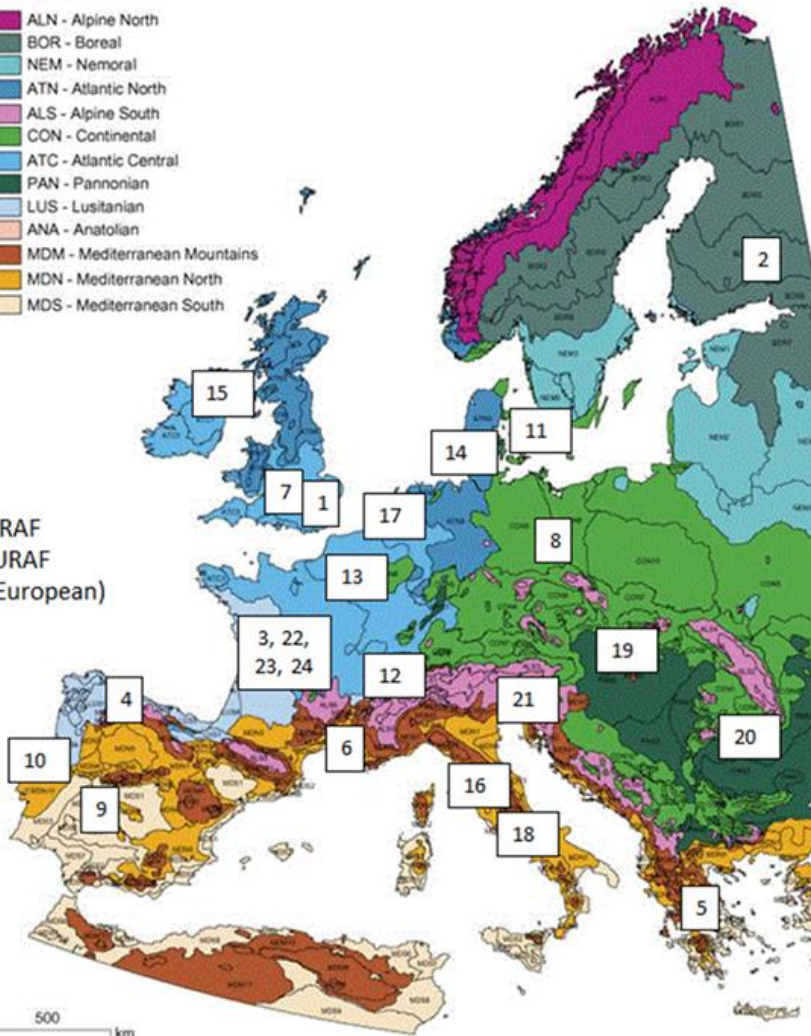
# Partners



Environmental Stratification of Europe

**Environmental Zone**

- ALN - Alpine North
- BOR - Boreal
- NEM - Nemoral
- ATN - Atlantic North
- ALS - Alpine South
- CON - Continental
- ATC - Atlantic Central
- PAN - Pannonian
- LUS - Lusitanian
- ANA - Anatolian
- MDM - Mediterranean Mountains
- MDN - Mediterranean North
- MDS - Mediterranean South



1.	Cranfield University	14	Aarhus University
2.	European Forest Institute	15	AFBI
3	ACTA	16	<b>CREA</b>
4	University of Santiago de Compostela	17	Louis Bolk Institute
5	TEI Stereas Elladas	18	<b>CNR</b>
6	INRA	19	NYME
7	Organic Research Centre	20	Universitatea Babeş-Bolyai
8	BTU Cottbus	21	<b>Veneto Agricoltura</b>
9	Universidad de Extremadura	22	Agroof
10	Instituto Superior de Agronomia, Lisbon	23	APCA
11	University of Copenhagen	24	Association Française d'Agroforesterie
12	Research Station FDEA-ART Zurich	25	World Agroforestry Centre
13	Wervel vzw	26	European Agroforestry Federation

# Objectives



1. To understand the context and extent of agroforestry in Europe
2. To identify, develop and field-test agroforestry innovations by working with farmers
3. To evaluate agroforestry innovations at field, farm and landscape scales
4. To promote agroforestry through policy development and dissemination

# 1. Context and extent of agroforestry



Preliminary stratification and quantification of agroforestry in Europe

Project name	AGFORWARD (613520)
Milestone	Milestone 1
Milestone name	Preliminary stratification and quantification of agroforestry according to systems studied in WP2-WP5
Original version	9 December 2014
Current version	24 April 2015
Authors	Michael den Herder, Paul Burgess, Maria Rosa Mosquera-Losada, Felix Herzog, Tibor Hartel, Matthew Upson, Iida Viholainen and Adolfo Rosati
Contributors	Nathalie Corroyer, John Erik Hermansen, Jaconette Mirck, João Palma, Anastasia Pantera, Vasilios Papanastasis, Tobias Plieninger, Andrea Vityi, Ansgar Quickenstein and Jeroen Watté
Reviewer	Approved by Nora Fagerholm (9 December 2014) Updated by Paul Burgess (24 April 2015)



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## Initial analysis of the extent of European agroforestry based on a literature review

den Herder, M., Burgess, P.J., Mosquera-Losada, M.R., Herzog, F., Hartel, T., Upson, M., Viholainen, I. and Rosati, A. (2015). Preliminary stratification and quantification of agroforestry in Europe. Milestone Report 1.1 for EU FP7 Research Project: AGFORWARD 613520. 53 pp

# Literature review: extent of “high nature and cultural value” agroforestry



Practice	Country	Extent (ha)	Source
Dehesa	Spain	3,606,151	Ministerio de Agricultura, Alimentación y Medio Ambiente 2008
Oak montado	Portugal	1,059,000	Inventário Florestal Nacional 2013a
Other Mediterranean	Greece, Italy, Portugal, Spain	2,296,846	Castro 2009; Papanastasis et al. 2009, Pardini 2009
Other wood pasture in continental Europe	Germany, Austria, Switzerland, Italy, Hungary, Sweden, Finland	387,639	Glaser and Hauke 2004; Greif 1992; Herzog 1998; Bölöni et al. 2008, Pardini 2009, Statistics Sweden 2013, Vainio et al. 2001
Wood pasture and parklands	UK	15,000	Maddock 2008 (10,000-20,000)
<b>Sub-total</b>		<b>7,364,636</b>	



Montado and goat grazing in Portugal, photo by João HN Palma.



Ancient oak-dominated wood-pasture from southern Transylvania, photo by Tibor Hartel

# Literature review: extent of agroforestry with high value trees



Practice	Country	Extent (ha)	Source
Streuobst	Germany, Switzerland, Austria, Croatia, Romania, Poland, Czech Rep	904,412	Eichhorn et al. 2006; Herzog 1998
Pré-vergers	France	151,000	Ducros et al. 2005
Other orchard systems	Denmark, Italy, Spain, Greece, Portugal	146,303	Statistics Denmark 2013; Cullotta et al. 1999; Papanastasis et al. 2009; INE 2002; Anuario Vegetal 2006
Agroforestry with olives, vines, chestnut, citrus and carob		1,553,625	
Traditional orchards	UK	25,350	Robertson et al. 2010
<b>Sub-total</b>		<b>2,780,492</b>	

den Herder et al. 2015



Sweet cherry and vegetables in Switzerland (Felix Herzog)



Olive trees intercropped in Lesvos, Greece, by Vasileios Papanastasis

# Literature review: extent of agroforestry



Country	Estimated area covered by agroforestry (ha)	Utilised agricultural area (ha)	Estimated agroforestry area as a proportion of UAA (%)
Austria	48,564	2,863,583	1.7%
Belgium	12,400	1,358,020	0.9%
Croatia	64,456	1,300,000	5.0%
Czech Republic	9,277	3,525,889	0.3%
Denmark	3,242	2,664,000	0.1%
Finland <sup>1</sup>	7,320	2,285,200	0.3%
France	510,130	29,000,829	1.8%
Germany	480,500	16,667,300	2.9%
Greece	2,096,688	4,150,990	50.5%
Hungary	22,815	5,338,015	0.4%
<b>Italy</b>	<b>967,038</b>	<b>13,133,855</b>	<b>7.4%</b>
Netherlands	3,000	1,841,600	0.2%
Poland	200,000	14,529,400	1.4%
Portugal	1,842,320	3,597,979	51.2%
Romania	180,105	13,733,143	1.3%
Slovakia	92	1,927,000	0.0%
Slovenia	185	480,000	0.0%
Spain	3,839,949	23,463,115	16.4%
Sweden	100,000	3,031,500	3.3%
Switzerland	97,312	1,051,630	9.3%
UK	157,524	17,172,000	0.9%
<b>Total</b>	<b>10,642,917</b>	<b>164,473,028</b>	<b>6.5%</b>

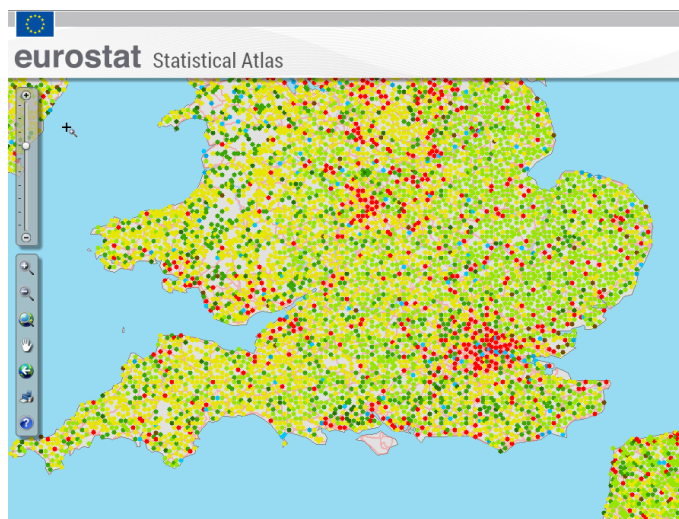
The literature review indicated about 10.6 million hectares of agroforestry.

This is about 6.5% of the agricultural area

Largest areas reported in Spain, Greece, Portugal and Italy



# Land cover surveys: extent of agroforestry



We are now comparing the results from the literature review with those from the European Land Use and Land Cover Survey (LUCAS). Tobias Plieninger and others have recently published an estimate of 20 million hectares of **wood pastures**, equivalent to 5% of the total land area

Extent of wood-pastures including pastures with spare trees (density of tree cover > 5%) and pastures with cultivated trees across Europe derived from the LUCAS database (Plieninger et al. 2015).

Country	Wood pasture area (ha)	Proportion of total area
Spain	5,809,600	11.7
France	2,104,900	3.7
Romania	1,699,000	7.2
Italy	1,514,500	5.3
Portugal	1,455,300	16.4
Greece	1,345,400	10.1
Bulgaria	1,144,800	10.3
UK	799,800	3.3
Germany	559,100	1.6
Sweden	525,600	1.2
Poland	474,600	1.5
Ireland	352,100	5.1
Lithuania	227,500	3.5
Hungary	216,600	2.3
Rest of EU27	875,200	1.1
EU-27	20,336,700	4.7

# 2. Innovation through participation



Established 40 agroforestry stakeholder groups across Europe  
800+ farmers and other stakeholders

# Agroforestry of high nature and cultural value



Dehesa, Spain and Montado, Portugal



Agroforestry with reindeer, Sweden

## Other systems

- **Oak wood pasture in Sardinia, Italy**
- Silvopastoral systems with oak, Greece
- Bocage agroforestier, Bretagne, France
- Wood pasture, UK
- Agroforestry in the Spreewald floodplain, Germany
- Wood pasture, Hungary
- Wood pasture, Transylvania in Romania

## Research focused on:

- tree regeneration,
- evaluation of triticale cultivars
- rotational grazing,
- understorey management,
- invisible fencing,
- carbon sequestration,
- biodiversity,
- social attitudes to wood pasture

# Agroforestry with high value trees



Intercropping and grazing of olive systems in Italy



Grazed orchards in England, Northern Ireland, and France

## Other systems

- Intercropping oranges in Crete,
- Chestnut agroforestry, Galicia, Spain
- Intercropping and grazing of walnut plantations in Spain
- Intercropping of olives in Greece
- “Bordure” trees in France

## Research focused on:

- Grazing of orchards with Shropshire sheep in France and England
- intercropping of olives with asparagus, flowers, barley, chickpea, and oregano in Italy.
- New chestnut varieties and methods of tree protection in Spain
- Use of legumes in walnut plantations, and the impact of pollarding wild cherry

# Integrating trees into arable systems



Poplar and oaks in arable crops in Italy



Mediterranean regions of France

## Other systems

- Trees in arable systems in Greece and Switzerland
- Alley cropping, Hungary
- Silvoarable agroforestry in France
- Silvoarable agroforestry in UK
- Alley cropping in Germany

## Research focused on:

- Appraisal of 40 year walnut silvoarable system
- Comparison of open-grown ash trees with those found in hedgerows
- **Arable crop yields between oaks and poplar, relative to controls**
- Use of medicinal plants between wild cherry trees.
- Plant breeding for agroforestry-adapted wheat in France and UK
- Effect on weed development and understorey management

# Integrating trees into livestock systems



Poultry agroforestry in the UK



Agroforestry with ruminants, France

## Other systems

- **Agroforestry with free-range pigs in Italy, Denmark and Spain**
- Agroforestry for poultry in the Netherlands and Denmark
- Fodder trees for goats and sheep in the Netherlands

## Research focused on:

- Synthesis of best practice
- Poultry and fruit growers working together.
- Nutrient leaching in Netherlands
- **Pig welfare in the Netherlands and Italy**
- Use of the *Morus* species as fodder for pigs.
- Feed value of different tree species (France, Netherlands, UK, and Denmark).
- Analysis of trees with dairy cows in France, and with beef cattle in the UK
- Effect of trees on grass production; shade-tolerant swards that survive beneath trees

# Developed research protocols



**AGFORWARD**  
Agroforestry for Europe

Research and Development Protocol  
for Iberian Dehesas in Spain

Project name	AGFORWARD (613520)
Work-package	2: High Natural and Cultural Value (HNCV) agroforestry
Specific group	Iberian Dehesas in Spain
Milestone	Milestone A (2,3) Part of experimental protocol for WP2
Date of report	23 February 2015
Authors	Gerardo Moreno, Yonatan Cáceres, Enrique Juárez, Manuel Bertomeu, Fernando Pulido, Paula Gaspar, Francisco J Mesias, Miguel Escribano, Pablo Burtos, University of Extremadura, Plasencia, Spain
Contact	gmorano@unex.es
Reviewed	Paul Burgess (1 June 2015)

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Each group has developed a protocol, available on the AGFORWARD website.

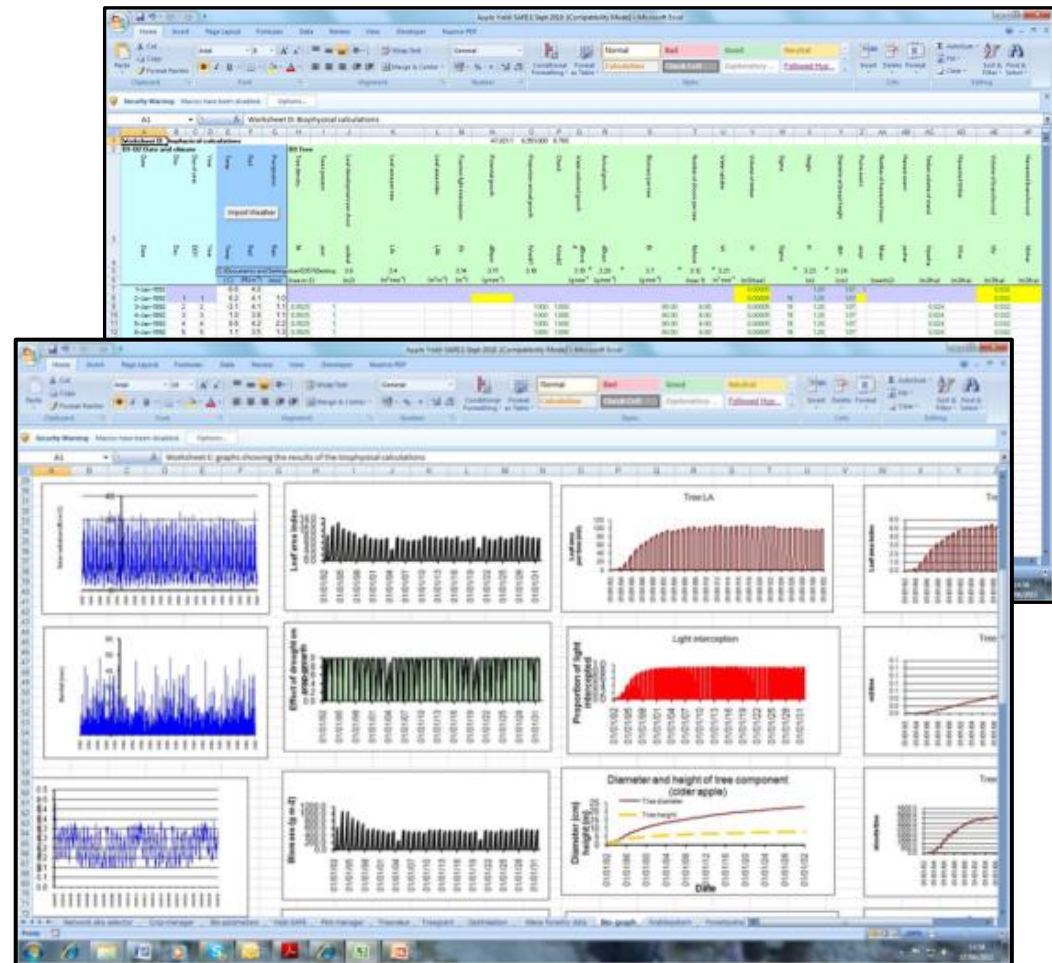
About 20-30% of the interventions are being addressed by a clearer assessment of the inputs and outputs of the systems using biophysical and economic models

# 3. Tree and crop yield analysis



We are using a parameter-sparse biophysical model called **Yield-SAFE** to describe tree, grass and arable yields on a daily time-step in different combinations (van der Werf et al, 2007)

A more detailed 3-D model called **Hi-sAFe** has also been developed by INRA

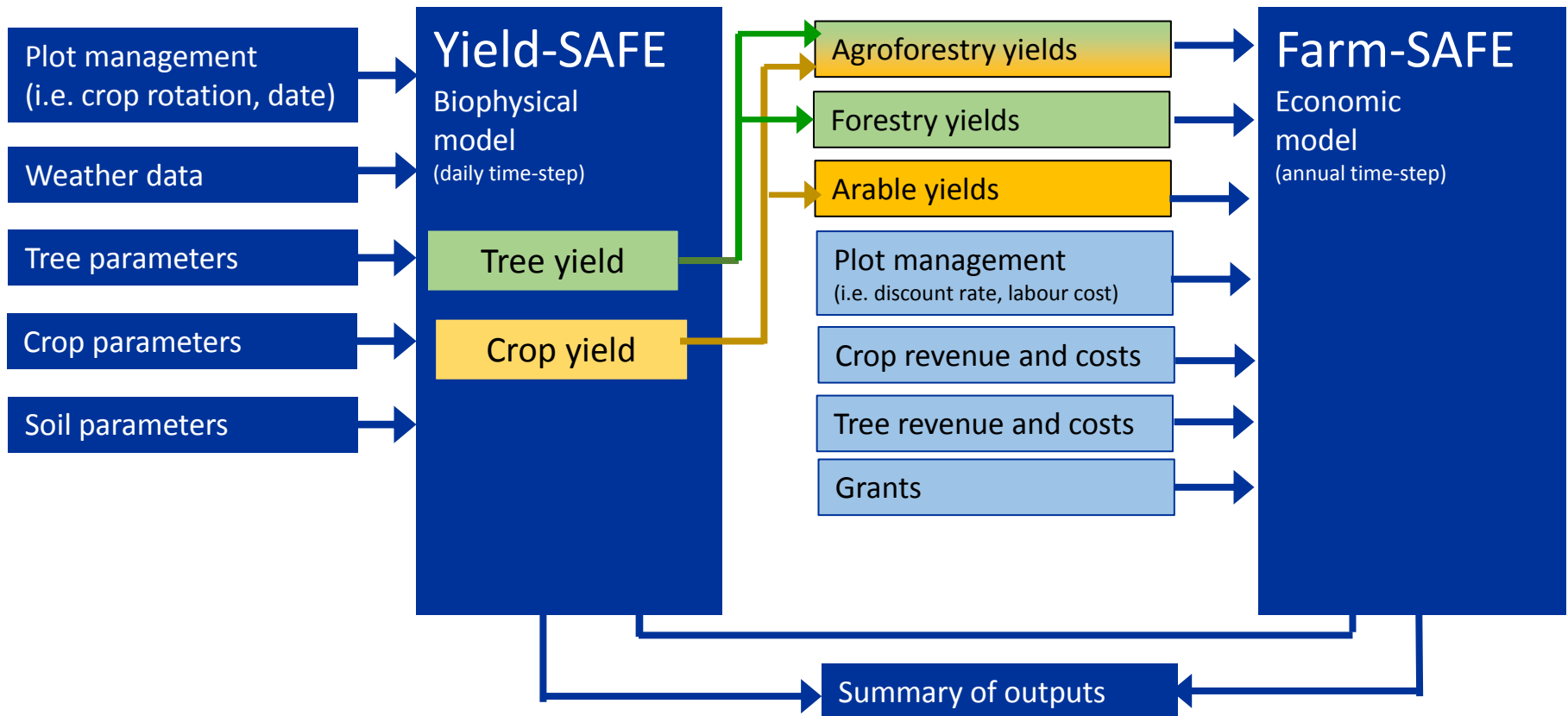




# 3. Financial analysis using Farm-SAFE



A spreadsheet model to integrate the results of the biophysical model with data on costs, values, and grants, and discount rates



# Case study 1: Woodland eggs in the UK (Burgess et al., 2014)



At least 3% of the UK market are woodland eggs: price (£ per six eggs) of free range and woodland eggs (source: retailers' websites, April 2014)

Supermarket	Free-range	Woodland
Aldi	1.00	1.19
Morrisons	1.39	1.59

UK consumers are willing to pay a premium of £0.20 for six woodland eggs in two supermarkets

UK egg packers are willing to give a price premium of £0.01 for six woodland eggs compared to “free-range” (IGD, 2008)

# 4. Policy analysis and dissemination

[Home](#)[News](#)[Context](#)[Farmer Networks](#)[Evaluation](#)[Policy](#)[Resources](#)[Partners](#)[Contact](#)[Intranet](#)

AGFORWARD has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 613520

## AGFORWARD

AGroFORestry that Will Advance Rural Development

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FR ES GR RO HU DE PT DK NL

Italian



## AGFORWARD News: August 2015

Agroforestry for Europe



### In this Newsletter:

#### Introduction

#### Agroforestry at EXPO 2015 in September

#### First progress report

#### Paper on wood-pastures

#### Crop-livestock-forest systems in Brazil

#### Second general assembly for AGFORWARD

#### Research protocols on high cultural and nature value agroforestry

#### Research on intercropping and grazing in orchards and with other high value trees

## Introduction

Greetings from a wet and cool UK and welcome to the August 2015 newsletter from the AGFORWARD research project (2014-2017), sponsored by the European Union FP7 programme. The first item publicises the Agroforestry Day at EXPO 2015 in Milan on Saturday 12 September. Please make it if you can.

The next three items are a progress report on the first year of the project, a paper published on European wood pastures, and details of a congress in Brazil which outlined plans to create 4 million hectares of crop-livestock-forest systems in Brazil by 2020. This is followed by a brief report on our second general assembly in June.

In the AGFORWARD project, each of 38 stakeholder agroforestry groups have now uploaded their individual research and development protocols to the AGFORWARD website. The activities include on-farm demonstrations and replicated experiments. If you can support a group near you, please e-mail the relevant contact person.

Lastly here is a date for your diary in 2016. AGFORWARD will be working with the European Agroforestry Federation and INRA at the Third European Agroforestry Conference taking place in Montpellier in France from 25 to 27 May 2016. It will be a great event; I hope that you will be able to attend or even contribute.

With best wishes,  
Paul Burgess  
AGFORWARD Project Co-ordinator

## Agroforestry at EXPO 2015 in September

The theme of EXPO 2015, being held in Milan, is "Feeding the Planet: Energy for Life". The European Agroforestry Federation, working with AGFORWARD, has organised an Agroforestry Event at the EXPO on Saturday 12 September 2015. Speakers are planned from the FAO, the European Commission, and from across Europe. The day will explain how agroforestry can contribute to improved food, fibre and energy security in Europe whilst enhancing the environment. If you are looking for a reason to visit EXPO 2015, please register and attend!

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**Agforward**  
Community

**Timeline** About Photos L

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Status



## Agforward

Published by Paul Burgess [?] · June 12 at 4:46pm · 🌐

Gerardo Moreno and colleagues, from the University of Extremadura, together the Dehesa stakeholder group in Spain have released their ambitious research and development protocol. The protocol covers tree regeneration, the use of triticale and legumes, rotational grazing, GPS collars, agroforestry products, and carbon sequestration. It is an impressive 71 page document. Watch this space!

<http://www.agforward.eu/index.../dehesa-farms-in-spain.html>



1,173 people reached

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# Conclusions



- AGFORWARD ([www.agforward.eu](http://www.agforward.eu)) is working with 40 stakeholder groups (800 farmers and other stakeholders) to promote trees in agriculture in Europe
- Some initial analysis from land use cover data indicates that agroforestry occupies about 5% of the total land area of Europe.
- We are using financial and economic tools to determine which practices work
- Join us at <https://www.facebook.com/AgforwardProject>

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Thank you



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