



Progetti europei sull'agroselvicoltura in Italia

(AFINET, SidaTim, SustainFarm, AGFORWARD)

Paris P., Pisanelli A., Consalvo C (CNR-IRET)



Il G.d.L. al CNR (IRET di Porano, Terni)

- Marco Lauteri
- Angela Augusti
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- Francesca Chiocchini
- Maurizio Sarti
- Giuseppe Russo
- Francesca Camilli (Ibimet Firenze)
- Marcello Cherubini
- Luca Leonardi



#88928518

Numerose collaborazioni con CREA, Univ., Enti pubblici e privati

Sommario della presentazione

- Agroforestry in Europa
- Alberi e Sistemi AgroForestali:
 - I. servizi eco-sistemici
 - II. PAC
 - III. produzioni legnose
 - IV. bilancio economico
- Conclusioni

I progetti di ricerca europei



FP7 Agforward (2014-17)



Facce-SidaTim (2016-19)



- Progetti partecipativi (StakeHolders Groups)
- SAF innovativi e tradizionali
- Agricoltura sostenibile per:
 - produtz. agro-alimentari,
 - legno,
 - ambiente,
 - mantenimento ruralità
- Ricerca - divulgazione
- Nuovi strumenti di comunicazione (social media, siti web multilingue, short video)

H2020 AFINET (2017-19)(2017-19)



Facce-SustainFarm (2016-18)

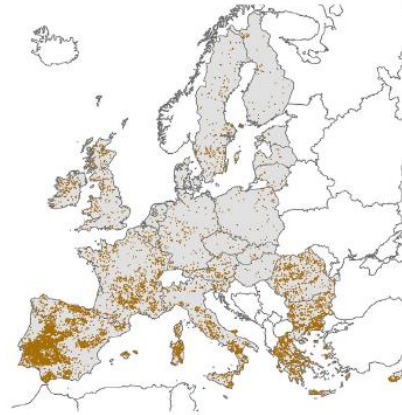


L'agroforestry in Europa ed in Italia

A) arable agroforestry



B) livestock agroforestry



C) high value tree agroforestry



D) all agroforestry



0 500 1,000 Kilometers



Mappatura in base a LUCAS 2015

- EU27 15.4 Mil. ha (8.8% SAU)
- Italia 1.400.000 ha (11% SAU)

Den Herder et al., Agr. Ecosy & Envir, 2017

*In press:
Which future for agroforestry
in Italy.*

*Paris et al. (17 co-autori)
Agroforestry Systems*

L'agroforestry in Europa

- Agroforestry (AF) for arable farms

11 Stakeholder Groups (SHG)

- AF for livestock farms

9 SHG

- High Nature and Cultural values

10 SHG

- High value tree systems

10 SHG

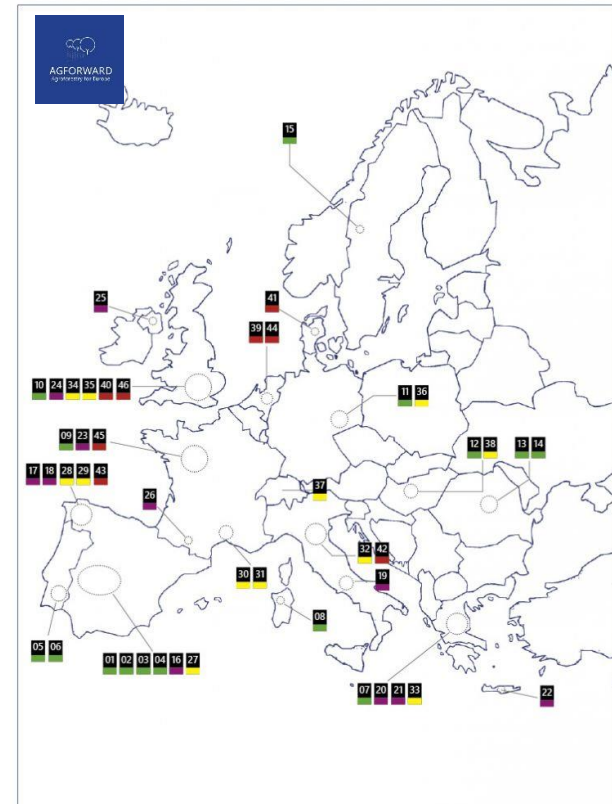
Special Issue Agforward- Agroforestry Systems

(Vol 92, Issue 4, Aug 2018)

>20 pubblicazioni in Open Access

46 Innovation leaflets (schede divulgative in Inglese)

Traduzione in AFINET



Agforward – SHG Italia



Camilli et al., 2018. Agroforest Syst



Biodiversità, Nuove opportunità di reddito



Danni da fauna selvatica, Costi di gestione, Meccanizzazione

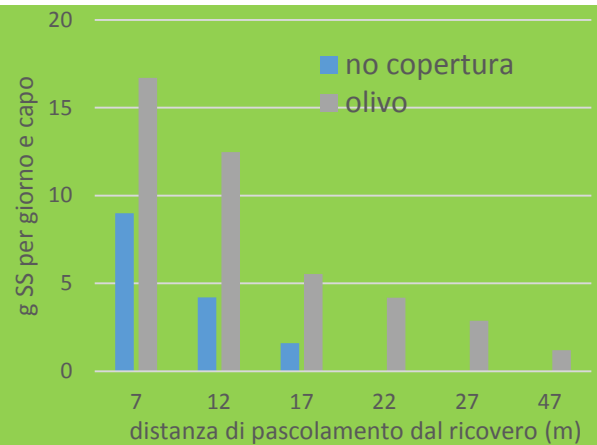
Category	Issue	Weighted mean score			<i>P</i>
		Farmers	Policy-makers	Researchers	
Positive perceptions					
Environment	Biodiversity and wildlife habitat	1.7	2.53	2.83	< 0.05
Socio-economy	Business opportunity	2.04	1	1	< 0.01
Negative perceptions					
Production	Losses by predation	1.45	1.11	1	< 0.05
Management	Management costs	2.33	1.76	1.14	< 0.05
	Mechanisation	1.12	1	128	< 0.05

Wp3. High value tree systems, in Umbria: focus su uliveti consociati a asparagi selvatici e allevamento di polli;

Con l'oliveto, l'impatto energetico ed ambientale (**Life Cycle Analysis-LCA**) dell'allevamento brado di polli/galline si riduce significativamente (**- 12/18%**)
Paoletti, Rosati et al. 2016 Journal of Cleaner Production

Possibile riduzione del rischio dell'influenza aviaria?
Olanda. Bestman et al., 2017. Agroforestry Systems

Oliv.-Spoleto (Pg)
A. Rosati
D. Mantovani



Dal Bosco, ..Rosati et al 2014
The Journal of Applied Poultry Research

01 Agroforestry SYSTEMS

Wild asparagus in olive orchards

Get more income from your orchard
www.agforward.eu

Why plant asparagus?

High yielding olive trees need plenty of light and need to be spaced apart. Hence both traditional and super-high-density orchards intercept no more than 50-55% of the sunlight. The rest will fall on the ground and encourage weeds. Why, then, not plant another crop you can sell under the trees, to use that light?

The understory crop must be adapted to shade. One possible crop is wild asparagus (*Asparagus acutifolius*) which is a culinary specialty in the Mediterranean. The spears can be harvested and sold in local markets. Growing under the trees, the asparagus does not affect the olive yield, while producing an additional crop.



Wild asparagus in super high density olive orchard with plastic mulch



Asparagus in traditional olive grove

Where and how to plant?

Wild asparagus is a long-lived perennial plant that does not require annual tilling and this means that the olive orchard can be managed with no-till, permanent green cover. Wild asparagus is hardy and tolerates drought, winter cold and rocky soils. Therefore if the growing conditions are right for the olive, the wild asparagus can also thrive.

Few nurseries produce wild asparagus plants, but plants can be produced from seed. Seed can be obtained from the fruits gathered from wild asparagus in the autumn. After harvest, the black and shiny seeds must be stratified¹ in moist sand. Depending on the origin of the seeds it can take up to one year for germination to occur. The seedlings can then be transplanted into containers where they can be grown for another year before transplanting in the field.

Young asparagus plants can be transplanted along rows of olive trees leaving the inter-row free to allow the use of machinery for olive pruning and harvesting. If planting only in the tree rows, the wild asparagus plants are typically planted at about 33 cm spacing along the row. This provides about 4000 to 5000 asparagus plants per hectare. Alternatively if the olives are manually harvested, the asparagus can also be planted in the inter-row area. In this case the wild asparagus can be planted at 33 cm spacing within 1 m rows. This results in about 30000 plants per hectare.



Wild asparagus seeds (left) and fruits (right)

¹ Stratification is the process of putting alternating thin layers of seeds with layers of moist sand in a container with adequate drainage at the bottom. This is usually done outdoors so that the seeds are subjected to the winter cold followed by warm spring temperatures to break seed dormancy.

Advantages

Producing a second crop of wild asparagus under olive trees increases the productivity per unit of land, whilst requiring few additional inputs.

The process of weeding, fertilizing and possibly irrigating the asparagus can benefit the olive trees without additional costs.

With increasing volatility in the market prices for olive oil and the uncertainty associated with climate change, crop diversification can protect farmers from extreme crop failures. It is unlikely that both crops will completely fail in the same year.



Asparagus in traditional olive orchard with straw mulch

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www.agforward.eu

2 March 2017

This leaflet is produced as part of the AGFORWARD project. Whilst the author has worked on the best information available, neither the author nor the EU shall in any event be liable for any loss, damage or injury incurred directly or indirectly in relation to the report.

Yields of asparagus

A mature plant of wild asparagus will produce 50-100 g of harvestable spears each spring (March to May depending on local climate). With 5000 plants per hectare (transplanting only along tree rows), the yield can be 250-500 kg per hectare, starting from the second or third year after planting. With 30000 plants per hectare (transplanting in rows 1 m apart also in the olive inter-row space) the yield can be 1500-3000 kg per hectare.



A wild asparagus spear ready for harvest

Disease, pests and weeds

As a wild (non-selected) species, currently wild asparagus suffers from few pests and diseases. Hence it can be grown as an organic crop. However the asparagus beetle can cause some damage, but rarely needs treatment. Weeds can be controlled by carefully managing grazing animals, such as poultry or sheep.

Labour, harvesting and marketing

Wild asparagus cultivation is unlikely to interfere with olive pruning and harvesting, if the olive harvest is carried out by hand or using vibrating combs. The use of harvest 'umbrella frames' is particularly suitable since the net is held above the asparagus vegetation.

Wild asparagus is a hardy crop, but it requires high levels of hand-labour particularly to harvest the asparagus spears and to control weeds. Hence although integrating olive trees and asparagus will increase the yield per unit of land, it will also increase the need for labour.

Asparagus spears can fetch high prices in local markets. However marketing fresh and perishable produce is a difficult task that needs to be carefully evaluated.

Further information

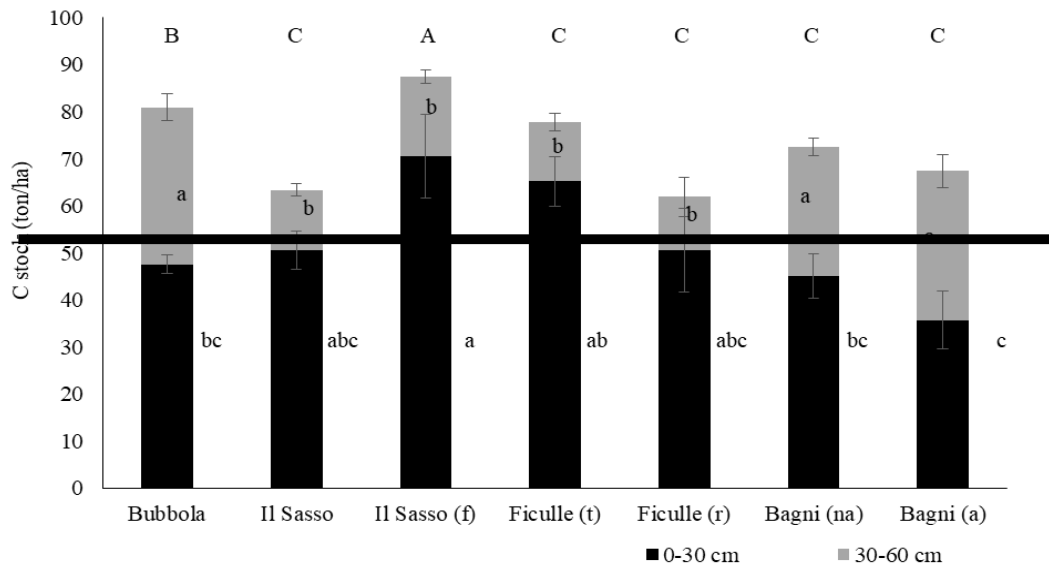
Benincasa P., Tel, F. Rosati, A. (2007). Plant density and genotype effects on wild asparagus (*Asparagus acutifolius* L.) spear yield and quality. HortScience 42(5):1163-1166.
Rosati A., Conceição L., Dal Bosco A., Mugnai C., Padellaro A. (2012). Video related to the results of a project on Olive, chickens and wild asparagus: www.youtube.com/watch?v=Ata73WwU2o/
Rosati A., Castellini, C., Dal Bosco A., Mugnai, C., Padellaro A. (2012). Manuale per la coltivazione consociata olivo, asparago selvatico, pollo rissotto. Edizioni 3A-PTA, Researchgate. 10.13140/RG.2.1.3665.4805.
Rosati, A. (2014). Coltivare asparagi selvatici e allevare polli in un piccolo oliveto. Vita in Campagna, 12-44-46.

AFINET – L'olivo come sistema agroforestale e serbatoio di C, Umbria



RISCHIO ABBANDONO

Media
0-30
cm It.
oliveti
51.5
(± 20)
Mg C
ha⁻¹)
Chiti et
al. 2012
Biol Feril
Soils



- **f:** bosco
- **r:** recupero oliveto abbandonato
- **t:** gestione tradizionale
- **a:** ammendato con letame
- **na:** no ammendato



Betani...Pisanelli et al (Uni BZ), Agroforest Syst, in press

3rd RAIN meeting: innovation list validation

Claudia Consalvo, CNR-IRET



Main theme	Innovation cluster	Innovation topic	Innovation title	Innovation type
Technical	Woody perennials management innovation cluster	Pruning	Pruning techniques in extensive olive grooves grazed by sheep	Best practice
Technical	Woody perennials management innovation cluster	Design	Identify best management practices to be adopted in the olive orchards	New practice
Economical		Alternative uses of woody component	The benefits of olive leaves in sheep feeding	New practice
Economical		Marketing	Residues in the olive processing: new bio-products and innovative value chains	New product
Policy and administration		Continuous learning	The bio district: a new proposal for a strong cooperation to serve environment	New ways of organising things
Communication challenge		Consumers education	Learning sustainability: agroforestry systems for biodiversity and ecosystem services	New service

Tree hedgerows in a study area of C. Italy

Mostly adult oaks trees with
a high aesthetic value



Few information is available about the current
extent of agroforestry systems because tree detection in agricultural areas is time consuming

Methods of study

Remote sensing

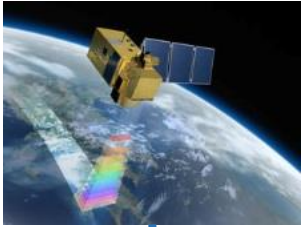
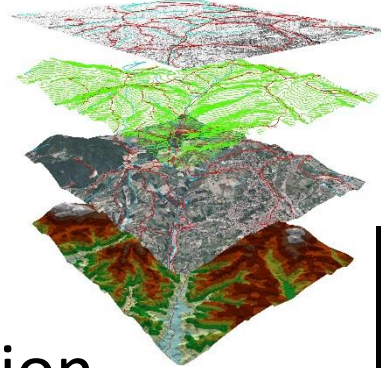


Photo interpretation

GIS analysis



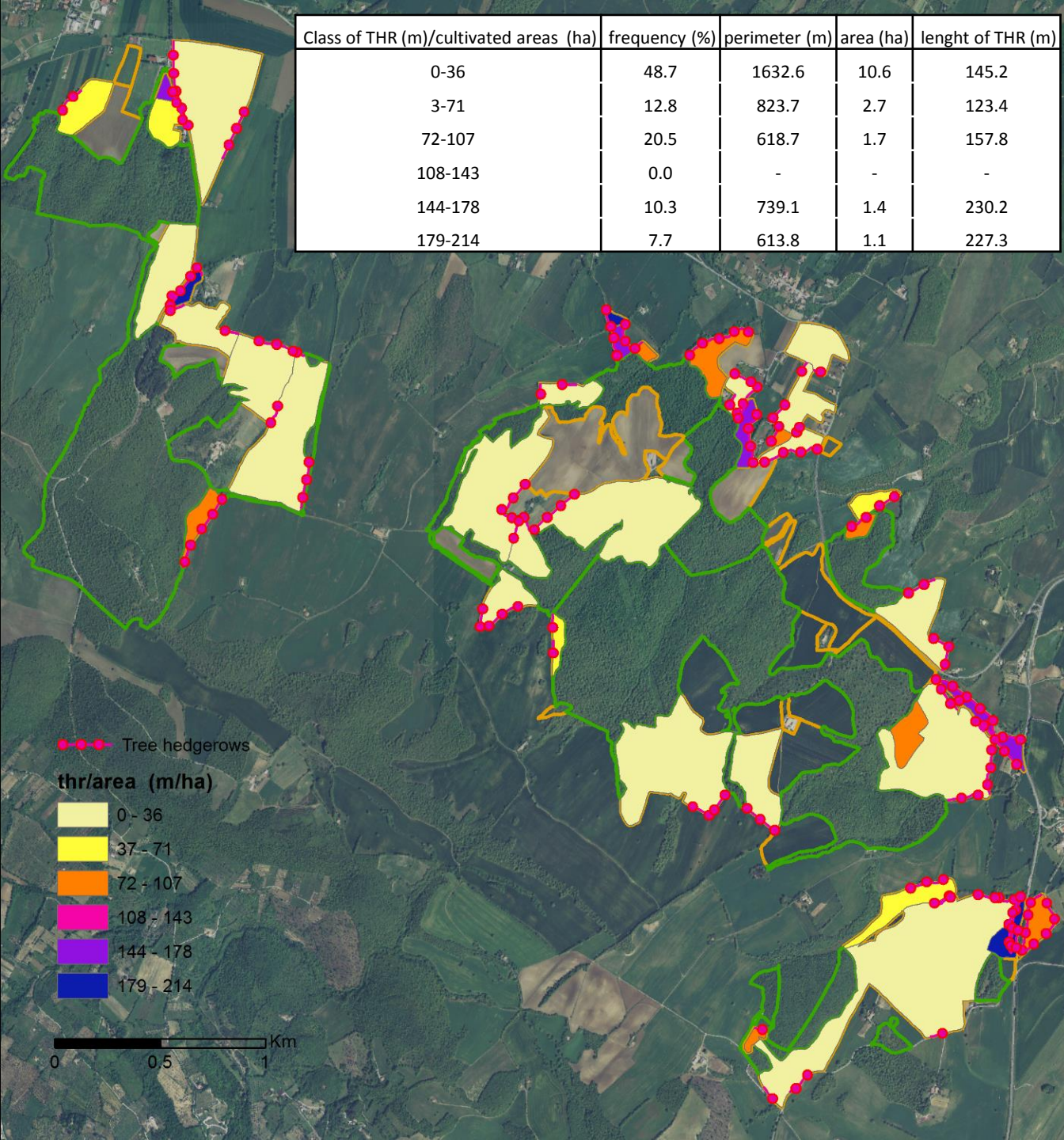
Field surveys



Hemispherical photography



- spatial complexity of the landscape patterns
- spatial interaction between crops and tree
- assessing, mapping and quantifying the socio-economic values of the agroforestry systems services



THRs summary statistics

- THRs length = **6241 m**
- Perimeter of field with THRs = **44885 m**
- THR length/area = **67 m/ha**

THRs length is **14%** of the total fields' perimeter

- Area covered by THRs = **7 ha**
- Total area of fields with THRs = **237 ha**

THRs cover **3%** of the total fields' area

HOW DO AGROFORESTRY TREES AFFECT THE SUPPLY OF REGULATING ECOSYSTEM SERVICES?

Crous-Duran J¹ et al., 2018. Proceedings EURAF Cong, Njimengen, The Netherlands

Modelli di Simulazione YieldSAFE e FarmSAFE

---- Arable/Pure pastures AF1 — AF2 - - - AF3 — AF4 Forestry/Pure SRC

AF1-4: 50-200 trees ha⁻¹)



Montado PT



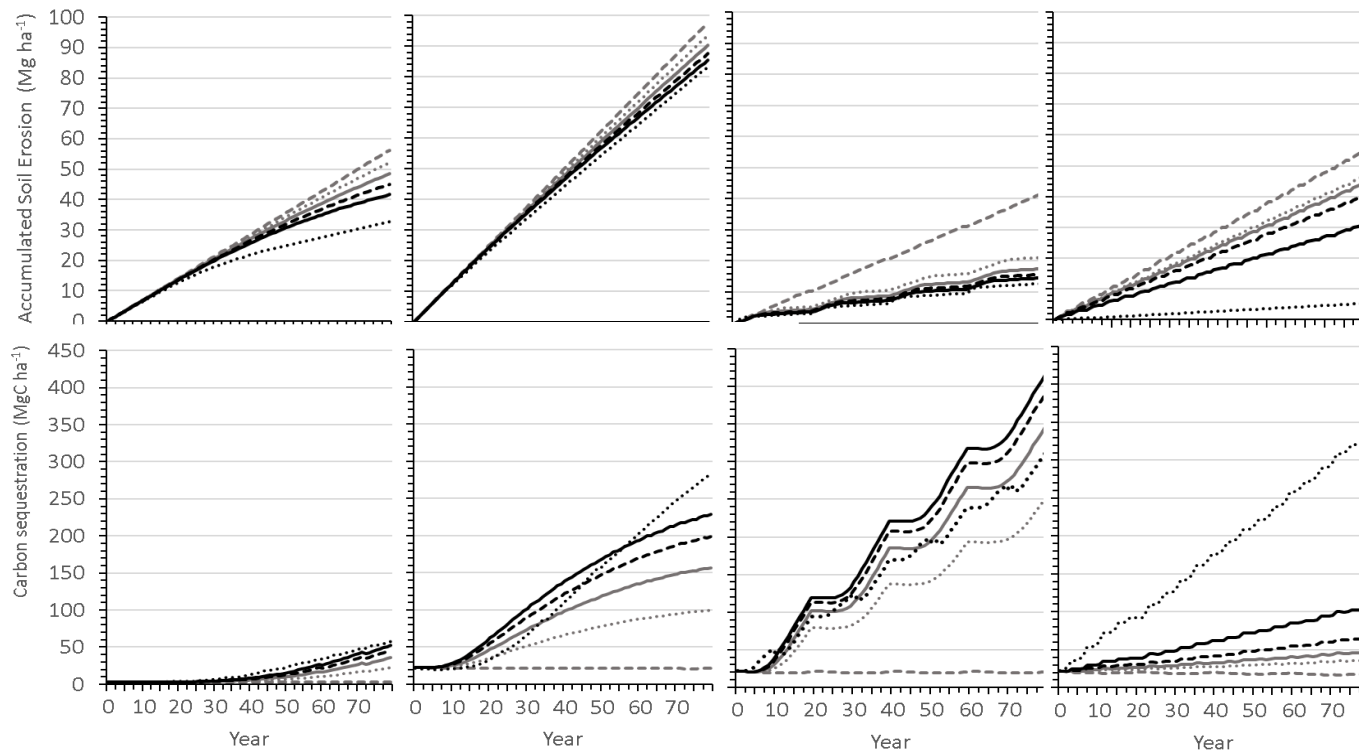
Cherry pastures CH



Silvoarable UK

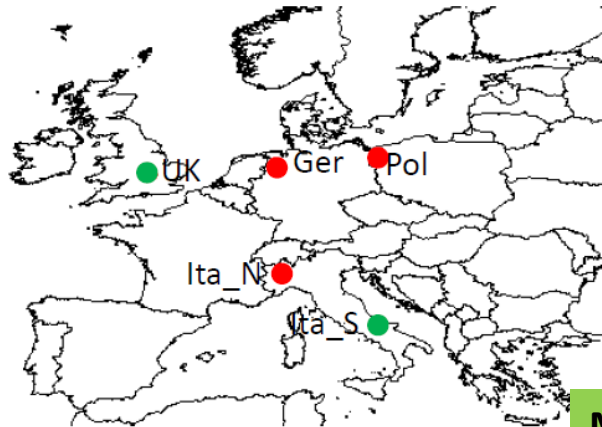


Short Rotation Coppice DE



SidaTim Experimental network

Sida hermaphrodita, *Silphium perfoliatum*

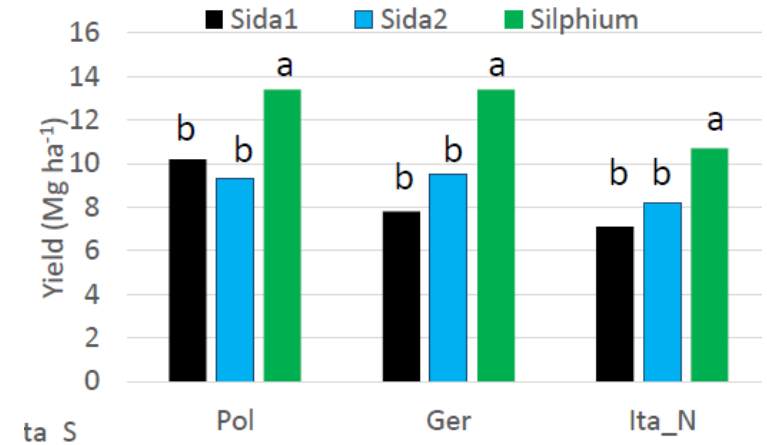


Main advantages:

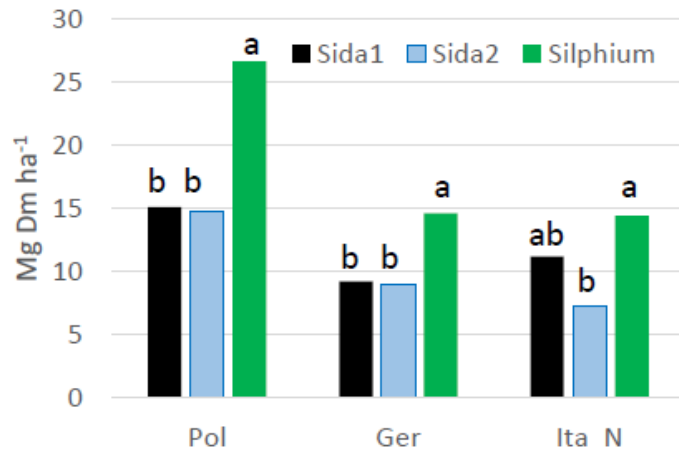
- Perennial herbs (not requiring annual plantation establishment=> low cost and high energy ratio);
- Sida for biogas: 2 annual harvests of green biomass (July and October);
- Sida for combustion: Dry biomass at winter harvesting (app. 17% of moisture content);
- Can be managed with standard farm machineries.

● Spring 2016
● Spring 2017

Sida, Jan.'18, Casale M. CREA, 2° year
harvest: root 2 years, shoot 1 year



Biogas, 2nd year, from seedlings



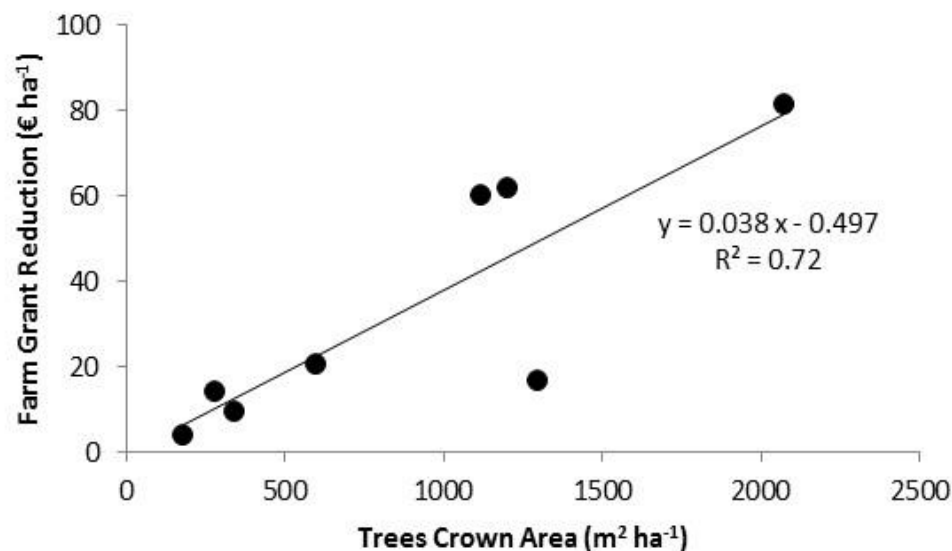
Biogas, Montenero di B., South Italy

Crop	Harvest for biogas	Days of field cultivation	Dry yield (Mg ha ⁻¹)	Irrigation (mm)
Sida 1	20 June	Ca. 80	17.3	no
Sida 2	20 June	Ca. 80	16.9	no
Sorghum	2 August	Ca. 120	23.4	66
Silphium	10 Sept.	Ca. 160	26.3	221

Agroforestry e PAC/PSR

Riduzione del Premio Unico aziendale ed alberi fuori foresta (TOF)

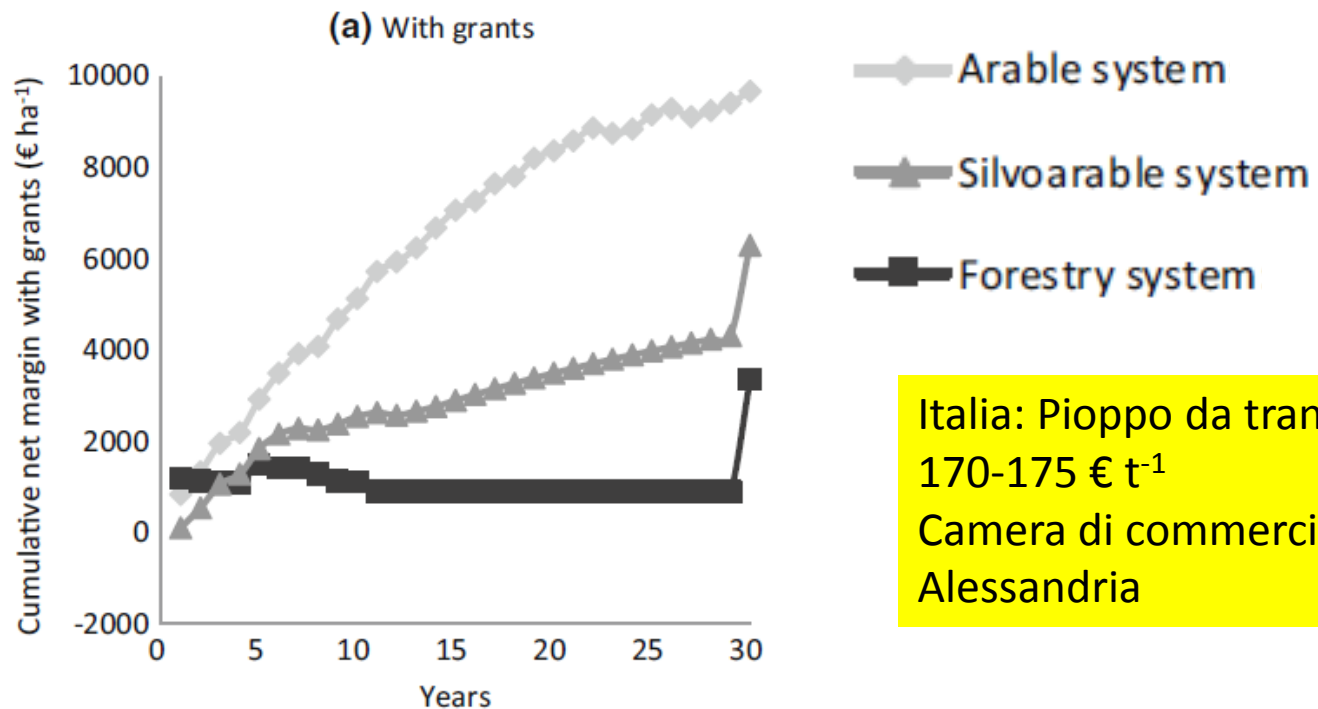
Sistemi tradizionali



Agroforestry e Redditività

Riduzione della PLV/produttività colt. erbacee

UK, pioppo 28 € t⁻¹: Agforward Project (2014-2017): Cash flow simulation with Yield/FarmSAFE



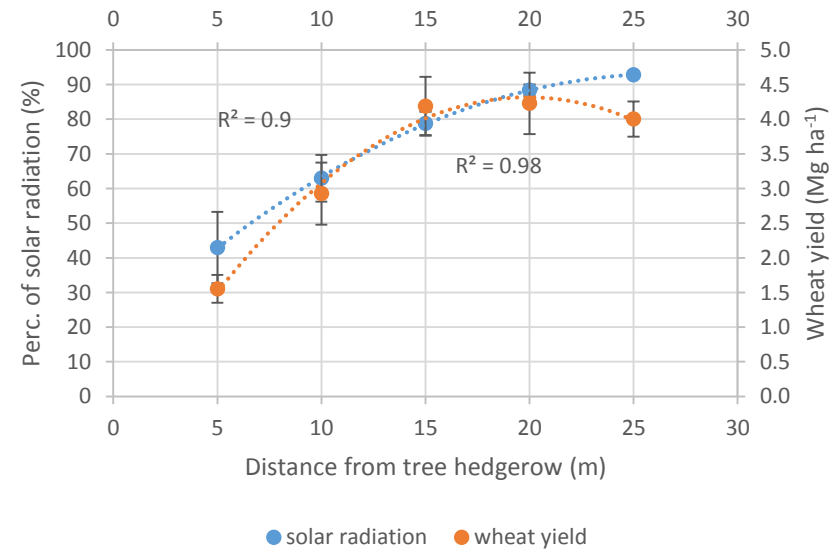
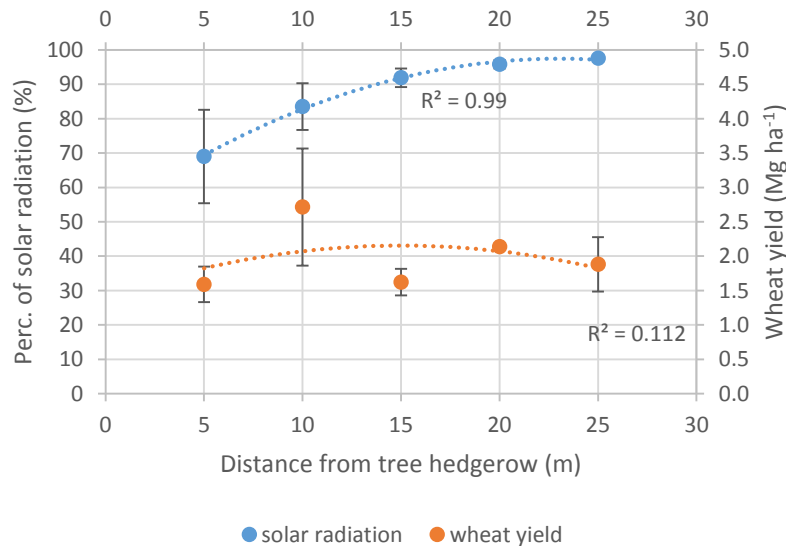
Italia: Pioppo da trancia
170-175 € t⁻¹
Camera di commercio di
Alessandria

Agroforestry e Redditività

Produttività colt. erbacee



Italia, filari di querce, Umbria



Pac ok sul fronte dei redditi, meno sul fronte innovazione ed emissioni

Il rapporto diffuso da Bruxelles è positivo. La Pac raggiunge gli obiettivi di incrementare commerci e redditi agricoli, siamo invece lontani dal target della riduzione delle emissioni di gas serra mentre la crescita di produttività è legata alla maggiore disponibilità di manodopera.

- Approccio di ricerca positivo: innovazione condivisa tra gli Stakeholder
- SAF da legno: dati in progress sulla redditività (mercato del legno, certificazione)
- Evidenti vantaggi sui servizi eco-sistemici dei SAF
- Novità più rilevante:
Nuovi strumenti (modelli di simulazione-monitoraggio da remoto) per la quantificazione e la valutazione economica dei servizi eco-sistemici dei TOF
- Aggiornamento PAC/PSR?