ARBRES & HAIES CHAMPÊTRES
ASSOCIATION FRANÇAISE

1st EUROPEAN AGROFORESTRY CONFERENCE

9-10 October 2012

AGROFORESTRY MANAGEMENT PLANS

Real operational intervention programs

Management of agroforestry systems and management plan

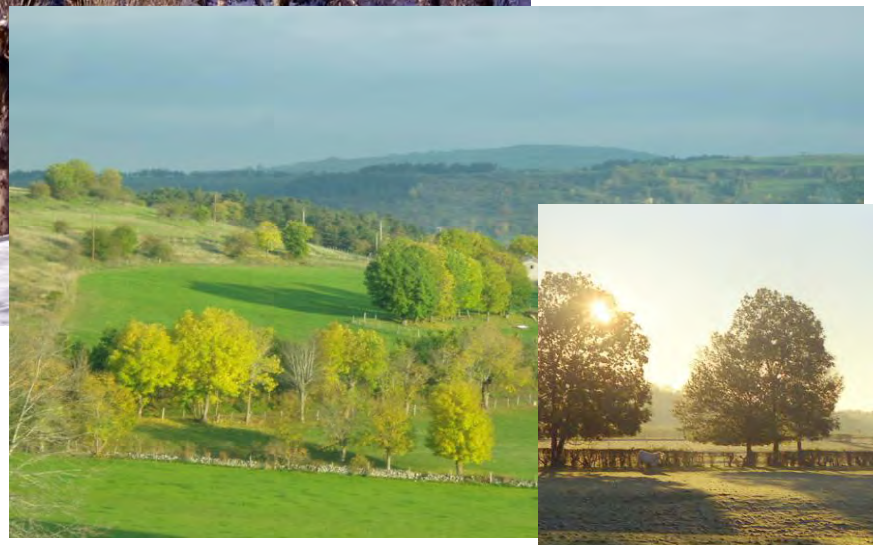
- The management of agroforestry systems :
  - Implementation of technical management procedures to effectively guide the evolutionary process
  - Concept of sustainable management

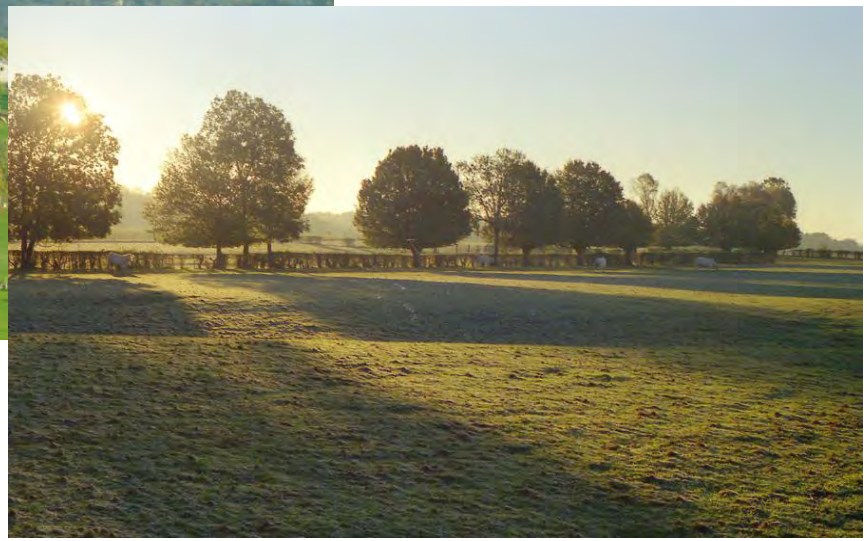
- The management plan :
  - Definition and organization of the operations to be performed
  - Real operational intervention program
  - Strategic approach conceptually elaborate AND pragmatism
  - Practical, simple and flexible technical guide
  - Essential to continuity of action and rational management

Coherence, supervision and follow-up

- <u>The management plan : an ambitious tool based on expérience but :</u>
  - Lack of coherence :
    - Diversity of content
    - Any real notion of sustainable management
    - Partial consideration of research work
- Necessity to supervise the elaboration of management plans :
  - Increasing use
  - Practical implementation
- Follow-up of the application :
  - Regulations
  - Ecocertification process

AFAHC : Rural trees and hedges French organization





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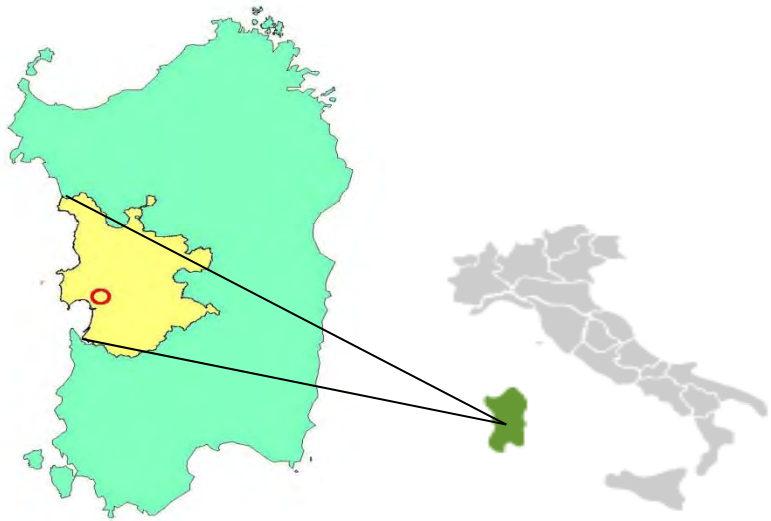
REGIONE AUTONOMA DELLA SARDEGNA
Ente Foreste della Sardegna

FIRST EUROPEAN AGROFORESTRY CONFERENCE

Priorities for European Agroforestry
Brussels, October 9-10, 2012

Puxeddu M., Marras G., Murino G.

PAULOWNIA TREE PLANTING IN SARDINIA (ITALY) AND ITS EVALUATION FOR AGROFORESTRY SYSTEMS AND SUSTAINABLE LAND USE

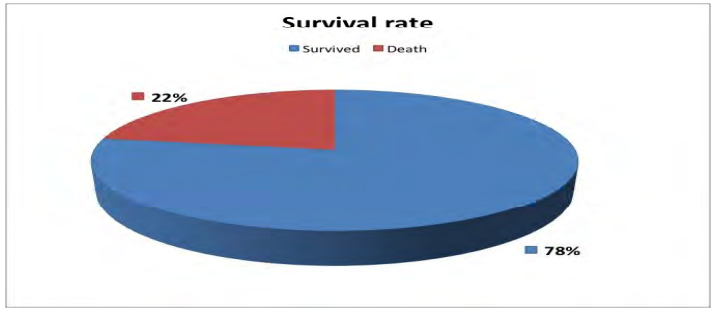


Surveys carried out:

After the second growing season on four random plots on the survival and some phenotypic traits of trees

Results

Survival and average values of surveyed parameters



Average values of surveyed parameters			
Density (ha^{-1})	Basal diameter (cm)	Height (m)	G ha^{-1} (m^2)
1040	4,4	2,1	3,04

Thank you for your attention!
We are specially grateful to Raffaello Giannini.

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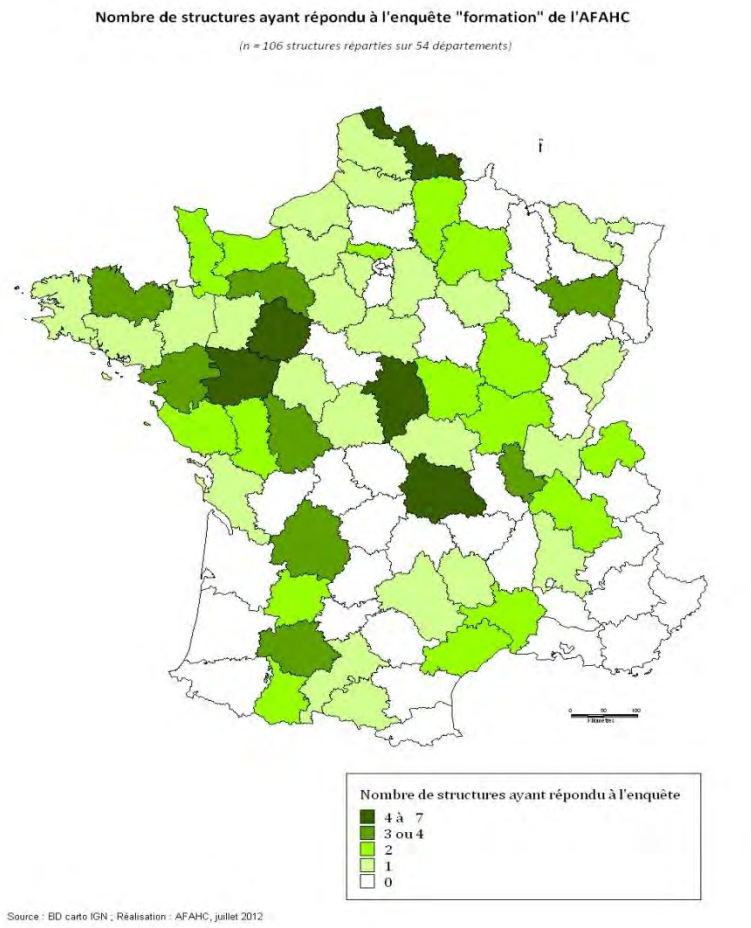
1st EUROPEAN AGROFORESTRY CONFERENCE

October 9-10 2012

Training advisors in Agroforestery(ies)

Clément O., Pays-de-Loire hunting federation;
Schneider C., Bourges territorial authority; ***Robert A.,*** AFAHC

Knowledge that could disappear



- Agroforestery(ies) needs pratical and theoretical knowledge.
- Trees or hedges are not in any degree course.

Goal / method :

- In the short term: showing that « advisor in agroforestery » is a specific job in France (in Europe too)
- An inquiry has been sent to the AFAHC network, in order to inventory all the actions that are implemented concerning pastoral trees or hedges (school, public, professionnal, farmers…)
- 106 partners answered: 54 local territories

Create a training network

Intitulé : Amélioration de l'itinéraire technique en trufficulture

Objectifs :
Organiser des sessions de formation pour les trufficulteurs sur les thématiques du sol vivant (matières organiques, analyse de sol, biomasse, …) et leurs relations avec les arbres (sylviculture, gestion d'une forêt, d'une haie séparative) en vue d'améliorer l'itinéraire technique de la trufficulture dans le respect de l'environnement.

Programme	Animation faite par 2 intervenants extérieurs (l'EURL Terre en Sève et un paysagiste-trufficulteur expérimenté), en 2 parties : - Présentation théorique sur les interactions sol/arbre, l'importance de la matière organique, les techniques d'analyse du sol, de gestion des arbres, d'entretien et de débroussaillage et de valorisation des rémanents issus de l'entretien par broyage sous forme de BRF. Tous ces points sont abordés dans le respect de l'environnement et pour la préservation de la biodiversité - Partie pratique appuie les interventions théoriques par des démonstrations techniques d'utilisation de matériels d'entretien et de valorisation (taille, broyage, …), de visites sur le terrain, de mises en application des techniques d'analyse du sol,…
Durée	2 journées, soit 14 heures de formation
Nb. de participants	12 à 20 personnes
Dates / Périodicité	3 sessions par an sur différentes périodes de l'année (novembre, mars et mai)
Public ciblé / Territoire éligible	- Professionnels de la trufficulture - Territoire de la Région Midi-Pyrénées
Contact	
GAIA	**GAIA Consulting** Laumadère - 32200 Saint-Caprais Caroline HEBERT Tél : 06 04 40 38 94 – Mail : caroline.gaiaconsulting@gmail.com Site internet : www.gaia32.com

La fiche n'est diffusée que sous la responsabilité juridique du contact

FORMATION NON DIPLOMANTE

- 3 or 4 training session for each partner: more than 350 actions, listed in a brochure
- Themes covered: biodiversity protection, agronomic interests, landscapes…
- Available soon on the AFAHC website

Conclusion :

In the medium term: professionalize the job of « advisor in agroforestery »

Writing convention, creating a « training network », even developping a real school career…

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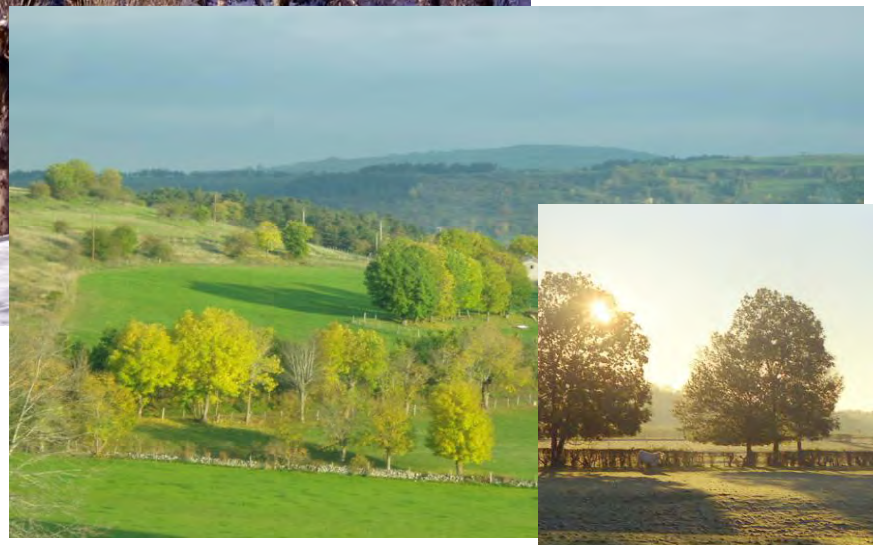
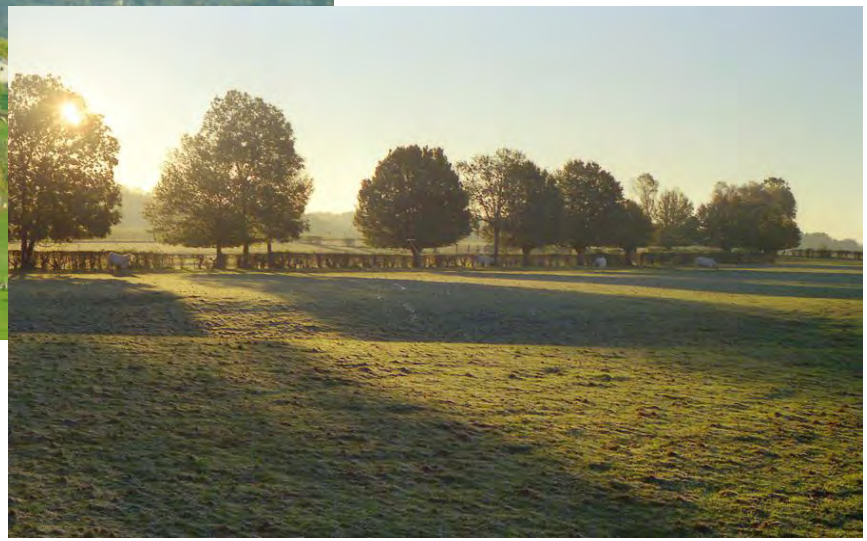




1st EUROPEAN AGROFORESTRY CONFERENCE 9-10 October 2012, Brussels

Towards the silvopastoral management of high quality timber plantation. The case of mature walnuts in Mediterranean Spain

G Moreno[1], ML López-Díaz, M Bertomeu ([1]gmoreno@unex.es)
Forestry Research Group, University of Extremadura, Plasencia 10600, Spain

AIMS

To evaluate the response of intensive walnut plantations (herbicides, mineral fertilization and plowing) to alternative silvopastoral systems (legume sown and grazing).

Harrow Brushcutter Grazing X **Three Watering regimes**

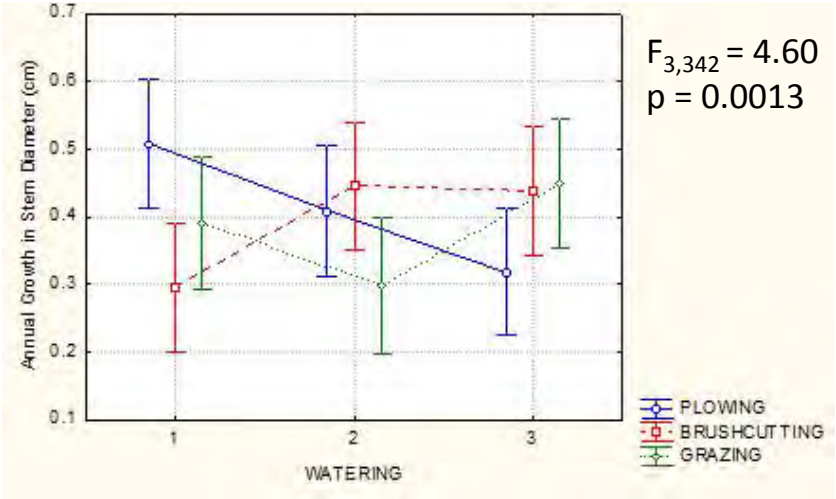
Fertilization Legume Control X **Three Watering regimes**

Spanish project SILVOMAD (Silvopastoral management for quality wood production: functional basis, productivity and environmental services) with the collaboration of the BOSQUES NATURALES company (www.bosques-naturales.com/).

Mean values (±S.E.) of CO2 assimilation rate and photochemical efficiency in walnuts with different types of fertilization and control of understory, combined with three regime of irrigation (1= lowest; 3= highest)

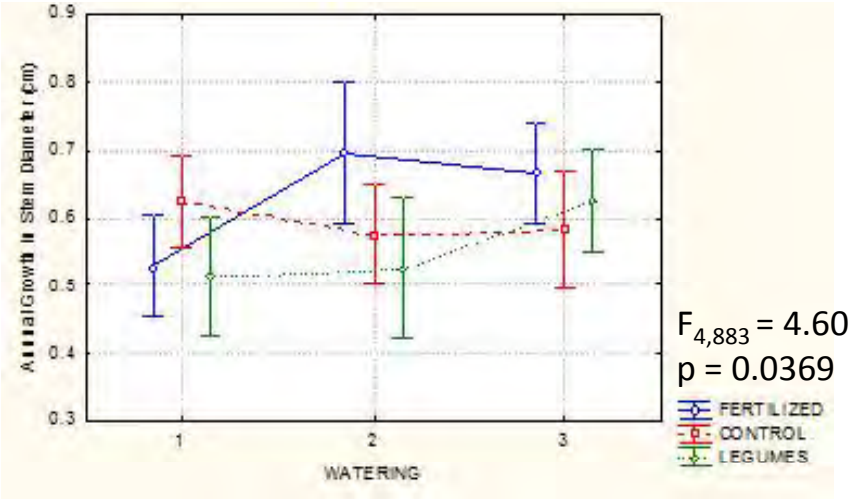
Management and Watering Treatments		CO_2 ASSIMILATION RATE µmol CO_2 m^{-2} s^{-1}			PHOTOCHEMICAL EFFICIENCY Fv/Fm		
		W1	W2	W3	W1	W2	W3
Treatments of Fertilization	Control	7.0±1.0 abc	7.3±1.1 ab	6.6±0.8 abc	0.790±0.005 d	0.807±0.003 ab	0.806±0.003 abc
	N-Fertilized	5.2±0.9 bc	7.6±1.0 a	5.3±0.9 bc	0.803±0.003 bc	0.806±0.003 abc	0.814±0.004 a
	Legume	5.8±0.8 abc	6.5±0.8 abc	6.3±0.7 abc	0.804±0.004 abc	0.797±0.004 cd	0.799±0.005 cd
Treatments of Soil Management	Harrow	5.6±0.6 ab	6.3±0.8 ab	5.3±0.7 ab	0.816±0.003 a	0.814±0.004 ab	0.811±0.003 ab
	Brushcutter	5.9±0.8 ab	6.4±1.0 ab	6.7±1.0 ab	0.817±0.002 a	0.813±0.003 ab	0.807±0.005 b
	Grazed	5.1±0.7 b	5.7±0.8 ab	7.1±1.1 a	0.810±0.004 ab	0.807±0.007 b	0.810±0.005 ab

UNDERSTORY MANAGEMENT X WATERING



$F_{3,342} = 4.60$
$p = 0.0013$

FERTILIZATION X WATERING



$F_{4,883} = 4.60$
$p = 0.0369$

Mean values (±$CI_{95\%}$) of annual increment of stem diameter (DBH) in walnuts with different types of fertilization and control of understory, combined with three regime of irrigation (1= lowest; 3= highest).

FIRST CONCLUSIONS

At short term, trees were only marginally affected by different treatments applied.

Moreover, slight worsening of physiological status of walnut leaves with legume sown and with grazing were compensate with higher dose of irrigation.

Harrow and fertilization did not improve significantly leave status and functioning, although affected slightly and significantly tree growth.

NEXT STEPS

To evaluate the reduction of nitrate and phosphorus leaching and the hypothetical increment in the carbon sequestration into the soil.

A detailed economical of different alternatives is also in course, to check if the slight reduction of tree growth with silvopastoral management is compensate with the reduction of the costs and the increment of the annual incomes (livestock).

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THE FIELD TREE, A SUSTAINABLE FIXER OF CARBON

1st EUROPEAN AGROFORESTRY CONFERENCE

9-10 October 2012

Laurandeau JM., Mission Bocage organization ; Gabory Y., AFAHC -"Rural Trees and Hedges" French organization

The field tree, a sustainable fixer of carbon

- Energy and Territories Climate Plans (the evaluation of potential carbon storage represented by hedgerows)
  - Field surveys regional and national programs
  - An inventory of hedges, a bibliographical synthesis, and typological classification to better define the components of hedges
  - To establish the volume and biomass of aerial and root parts, but also of the soil by the presence of the trees elements.

The field tree, a sustainable fixer of carbon

- To estimate the carbon storage:
  - The assessment of the carbon stock of a hedged farmland.
  - The evaluation of the annual growth of the hedges,
  - Observation and development of practices helping the assessment of the carbon influx

Storage from 30 kg to 1.23 metric ton of $C0_2$ per 100m per year

according to the type and location of the hedge notably against the slope

The field tree, a sustainable fixer of carbon

- Future for the carbon storage
  - The increase of carbon storage
    - Maintenance of old hedges workable
    - Increase and regeneration of hedge networks.
    - Trees and hedges plantations

hedgerow management plans =

the first step of wood production optimization

  - The establishment of a carbon market
    - To give a carbon value to hedgerows in addition to energy and timber wood.
    - By discussions with all the stakeholders and some new ones as producer groups.

AFAHC

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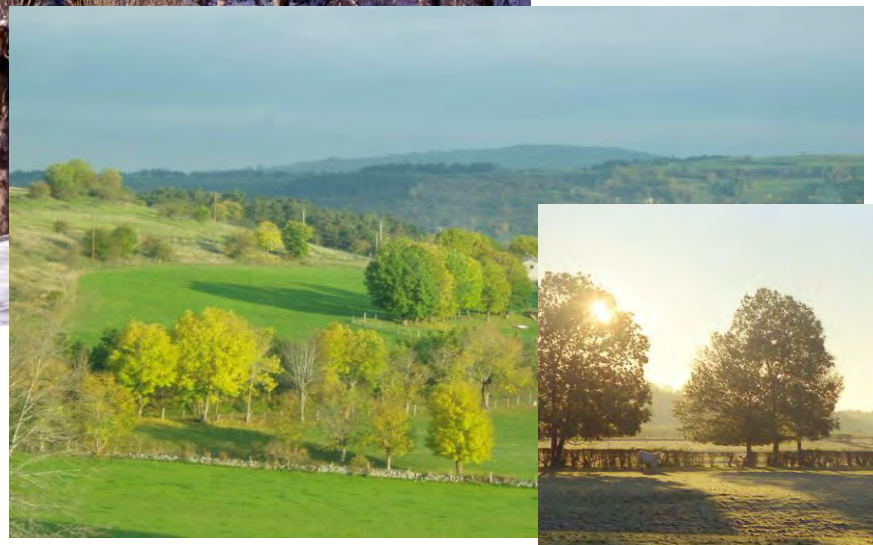

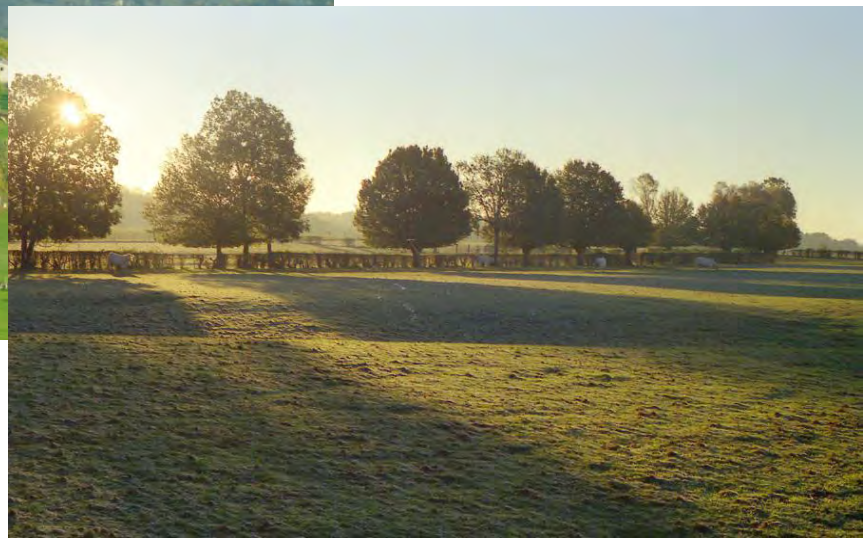

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AGROFORESTRY IN SLOVENIA

Revival of traditional land use

Saša VOCHL, Tine PREMRL, Tine GREBENC, Andreja FERREIRA

1st EUROPEAN AGROFORESTRY CONFERENCE 9-10 October 2012, Brussels

GOZDARSKI INŠTITUT SLOVENIJE
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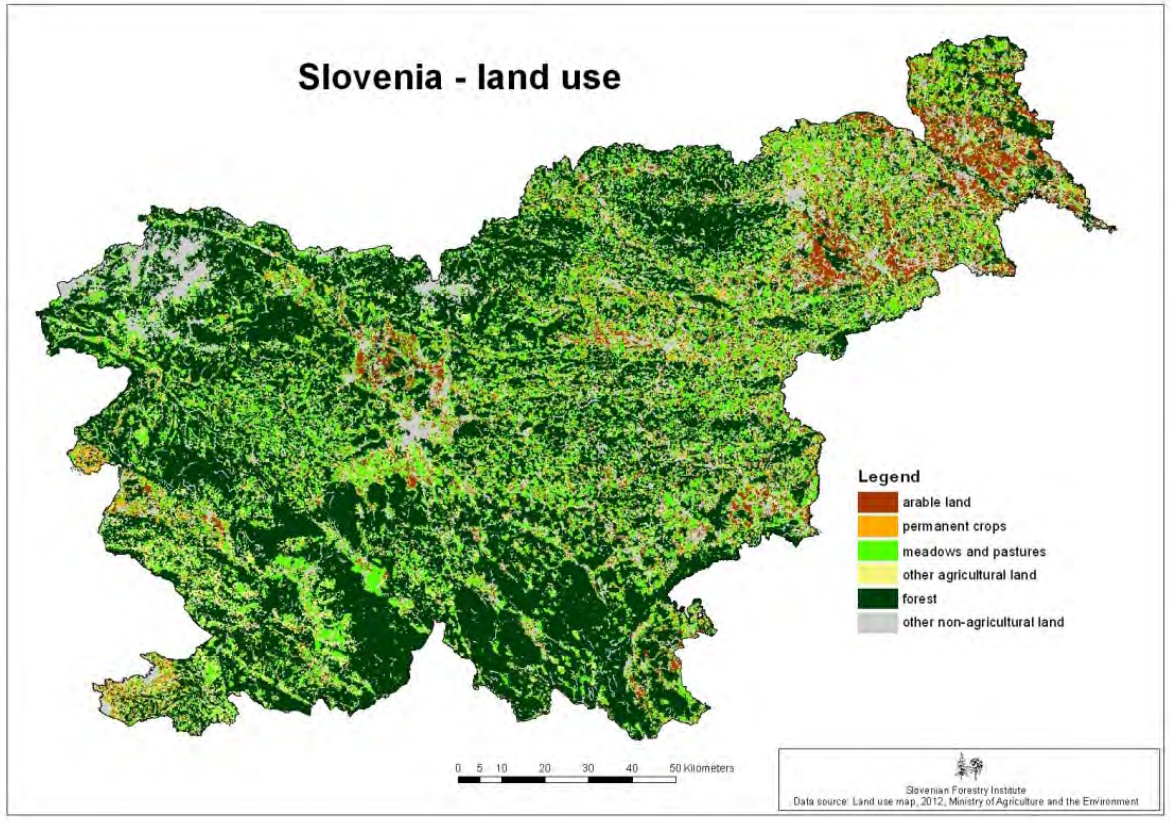
SLOVENIA'S LAND USE

Lad use	Share %	Land use	Share %
Arable land	9,11 %	Other agricultural land	2,96 %
Permanent crops	2,58 %	Forests	59,66 %
Meadows and pastures	18,13 %	Other non agricultural land	7,55 %



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AGROFORESTRY PRACTICES AND POTENTIALS IN SLOVENIA

Agroforestry practice	Practices / **potential** in Slovenia
Silvoarable agroforestry	Alley cropping, scattered trees, line belts (hedgerows, shelterbelts, **windbreaks** and forest belts)
Riparian buffer strips	Natural riparian buffer strips, **buffer strips on the ameliorated rivers and reclemated land**
Forest farming	Included in normal forest management (medical plants, mushrooms, **truffles**, berries, honey)
Silvopasture	Momentarily limited by forest legislation. Potential on »**the open forest trees«** type
Multipurpose trees	**Orchards**
Improved fallow	Not known to be practice

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AGROFORESTRY STATE OF THE ART IN SLOVENIA

1. Lack of experiences, knoliage and practicites
2. Undeffine exsistec practice
3. Dividation between forestry and agriculture sphere
4. Legistlation barriere

Corresponding: tine.premrl@gozdis.si

Thank you for your attention !

Acknowledgements

We are very grateful to organizers to give us opportunity to be here and learn about agroforestry for which, we believe it is also place in our country!

The partners from the Slovenian Forestry Institute were co-financed by the Ministry for Higher Education, Science and Technology of the RS, through the Research Programme P4-0107 and through a program of Public Forest Service

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THE RURAL TREE AS A GREEN NETWORK OF AGRICULTURAL LANDSCAPES

1st EUROPEAN AGROFORESTRY CONFERENCE

9-10 October 2012

Gabory Y

AFAHC ("Rural trees and hedges" - French organization)

The rural tree as a green network of agricultural landscapes

- Context:
  - Changeover from diversified family farming to simplified industrial farming system (increase of field size, need of more productivity…)
- Consequences:
  - Decrease of different natural elements as hedges, ponds, bank, dry stone walls…
  - Deletion of biological road links (called corridors)

More and more difficulties for feeding, growing and finding breeding conditions for biodiversity

The rural tree as a green network of agricultural landscapes

- What we have to do…
  - Complicate the landscape to obtain the balance again
  - Use this natural balance for agricultural production system (intelligent feeding to increase fungi diversity…)
  - Increase the agricultural productivity by this ecological services.

The rural tree as a green network of agricultural landscapes

- … To link natural elements again:
  - Maintain local structuring elements of the landscape
  - Trees plantations in hedges :
    - Give refuge, feed and breeding conditions for species
    - Improve the soil structure by increase the moisture (for fungi), the organic matter rate (for others productions)

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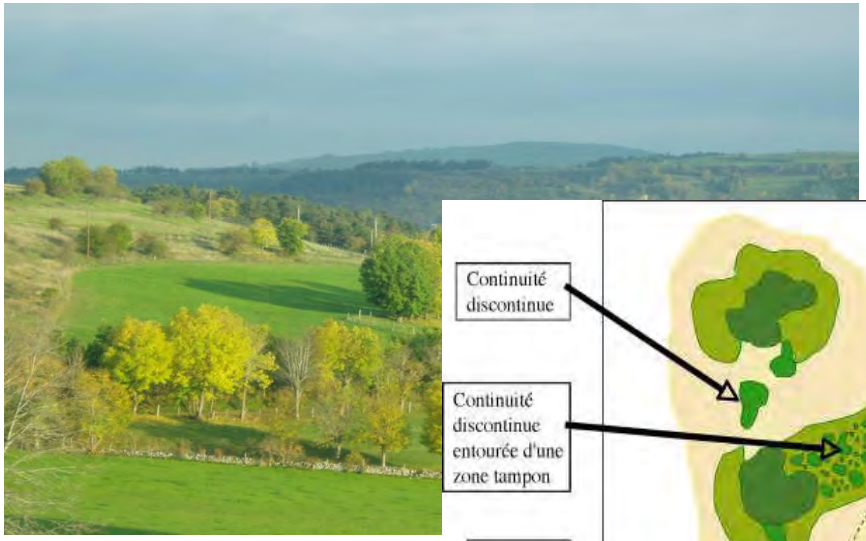

AGROFORESTATION AND LEVEL OF INCOME IN ITALIAN RURAL AREAS: AN ANALYSIS OF MULTIFUCTIONALITY IN RURAL DEVELOPMENT PLAN

Nicola Galluzzo

Asgear *(Associazione Studi Economico-Geografici delle Aree Rurali)*
Italy

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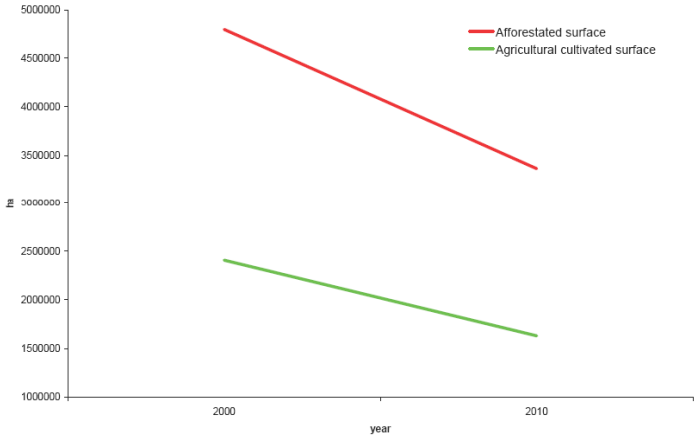
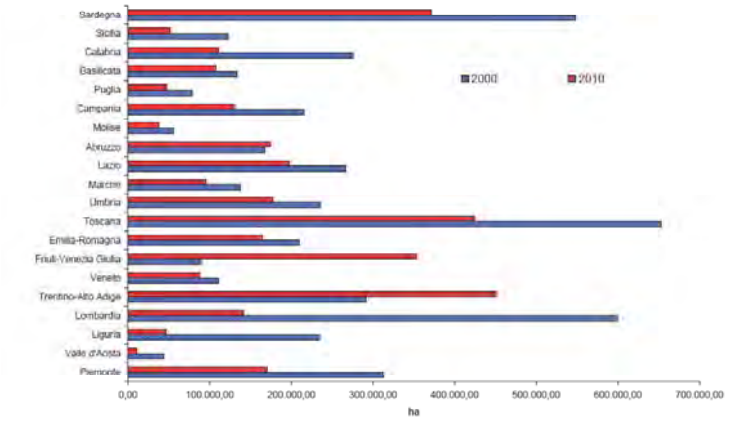
The aim of this research was to analyze, using a multiple regression model, the main interrelationships among the dependent variable general conditions in the countryside and the independent variables amount of subsides paid by the European Union to improve afforestation actions in rural areas.





Afforestated surface and its evolution in Italy over 10 years (Source: our elaboration on data www.istat.it Census of Italian Agriculture 2000 and 2010)

Results:

- From 2000 to 2010, the statistical data of Italian Agricultural Census made by Istat, it was possible to observe a decrease both in cultivated surfaces and also in number of farmers.
- Three Italian regions only have enhanced the afforestated surfaced and two of these are located in the north of Italy.
- The multiple regression model in 2000 has pointed out a direct correlation among the independent variables afforestated surface, workforce in the primary sector and public funds allocated by the European Union to improve the forestation actions.
- The multiple regression model, during 2007-2013 time, has underlined as the independent variable public funds allocated by the European Union to promote forestation actions did not have any effect.

Final remarks:

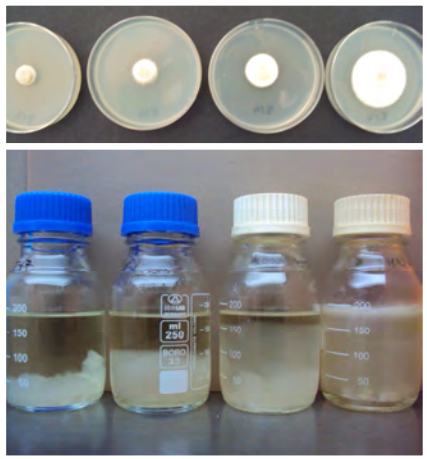
The agroforestation has been a positive tool to increase the pluriactivity in the primary sector and to protect rural space enhancing the level of income in rural spaces.

Proyect RTA2009-00011-00-00

Contribution of mycosphere bacterial isolates obtained from the *A. caesarea* mycosphere to the stablishment and development of the *Castanea sativa*/*Amanita caesarea* mycorrhizas

JUNTA DE ANDALUCIA
Instituto de Investigación y Formación Agraria y Pesquera
CONSEJERÍA DE INNOVACIÓN, CIENCIA Y EMPRESA

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD
INIA
Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria



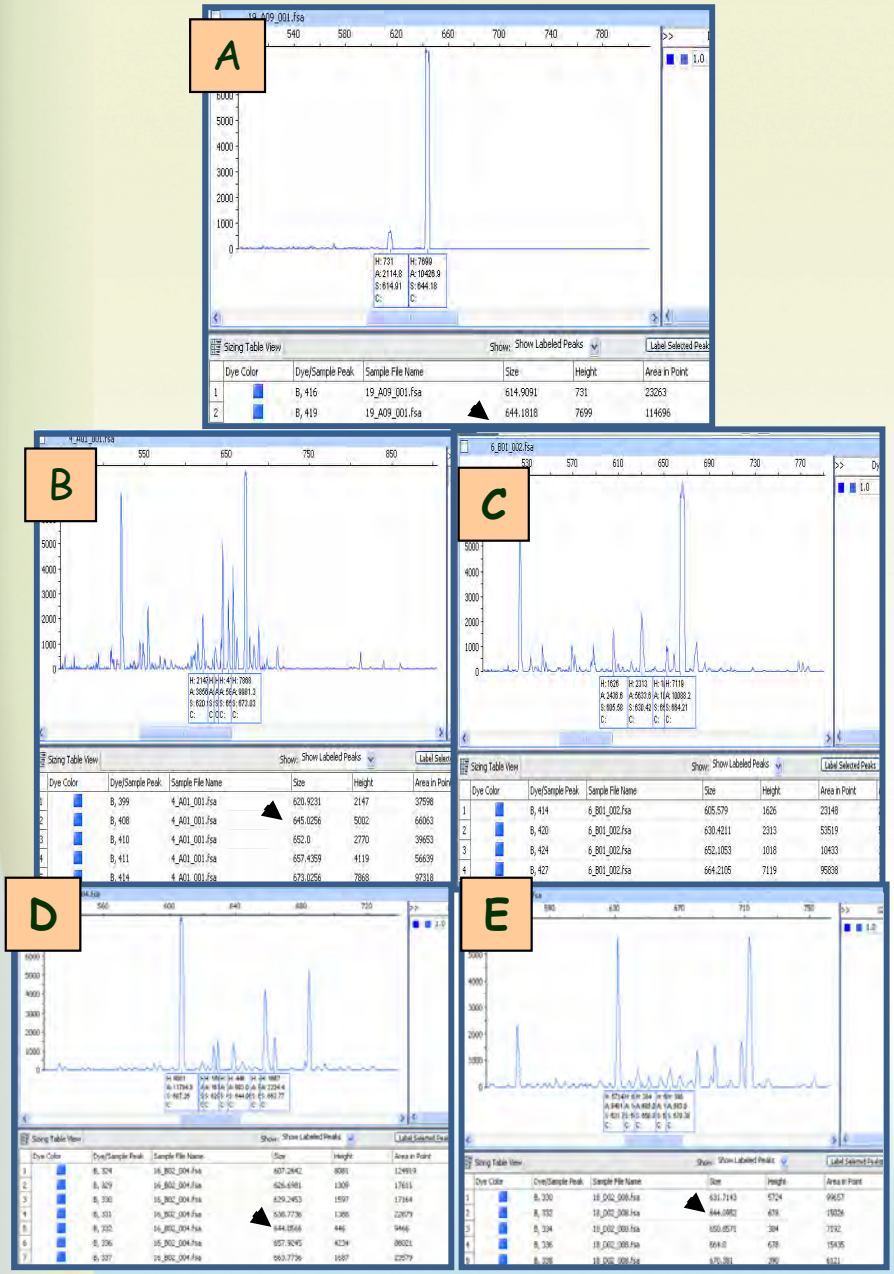
Selection of *A. caesarea* strains based on its growth rate in synthetic culture media

Inoculant production and viability control of alginate entrapped inoculum.

Chestnut grove and saplings

Chestnut sapling inoculation

Four months after inoculation:
-Rhizospheric soil samples were taken around saplings
-Extracted DNA was analyzed by ARISA



ARISA profiles

A: *A. caesarea* pure culture as reference (peak of 644bp).

B and **C**: site 4 and site 6 before *A. caesarea* mycelial inoculation.

D and **E**: site 4 and site 6 after inoculation.

Successive soil samples are being analyzed over the time to confirm the potential of this method to inoculate chestnut saplings.

Olive tree and annual crops association's productivities under Moroccan conditions

Daoui K.; Z.A. Fatemi; R. Razouk; A. Bendidi; A. Chergaoui; A. Ramdani

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INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE | INSTITUT AGRONOMIQUE ET VETERINAIRE HASSAN II | ECOLE NATIONALE D'AGRICULTURE DE MEKNES | ECOLE NATIONALE FORESTIERE DES INGENIEURS DE SALE

Consortium de recherche IAV, INRA, ENA, INFI / APP MCC

In Morocco AGROFORESTRY is used in mountainous and oasis regions where water and/or land resources are limited. In these locations many crops are mixed and their monitoring is complicated. Unfortunately, few scientific studies were dedicated to such system and someone might describe it as primitive, none productive and must been changed. The aims of this work, are a) determination of the importance of olive tree and annual crops association b) estimation with farmers of the productivity of the association and c) evaluation of advantages and disadvantages of such practice according to farmers and scientists point of views.

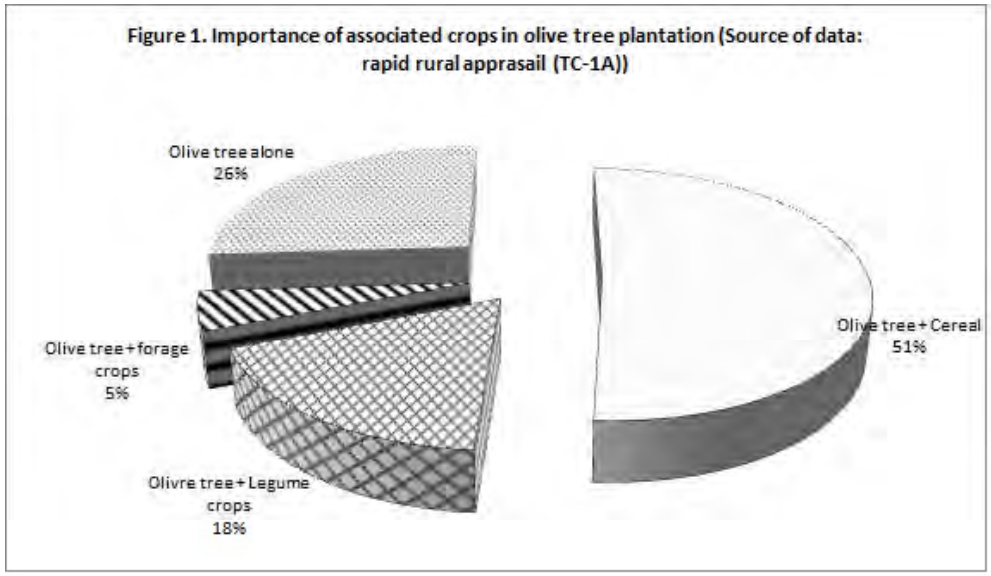
Material and Methods

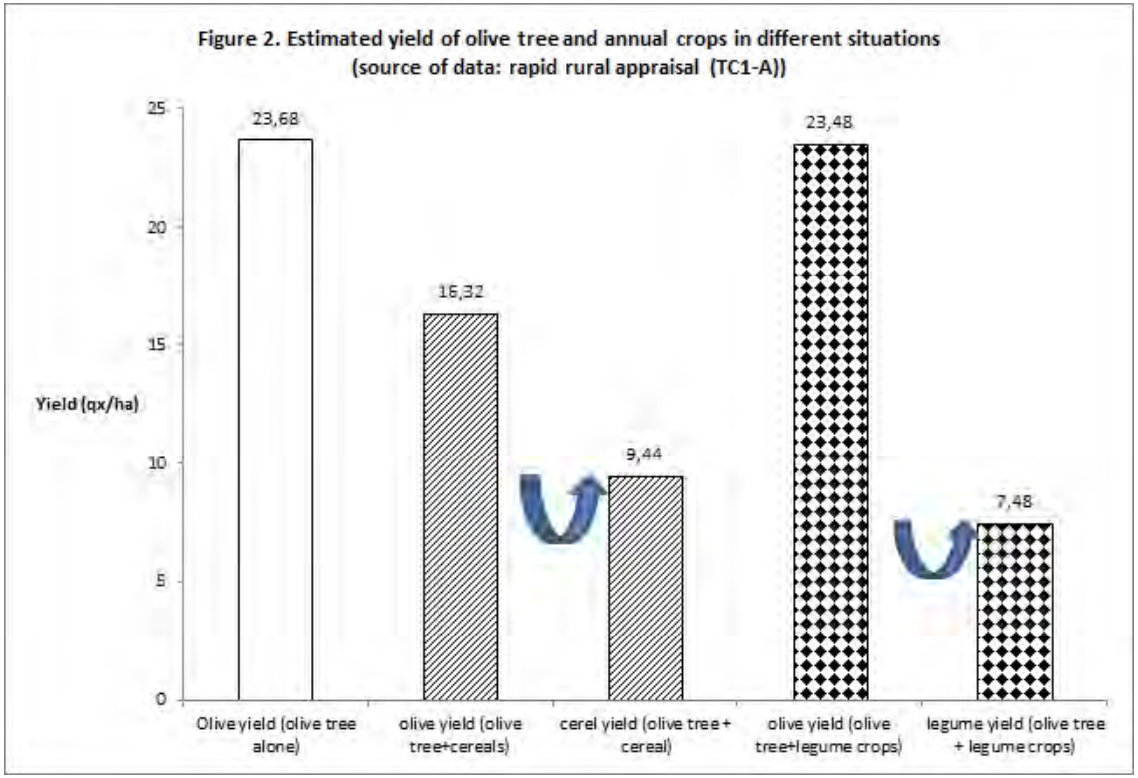
This study is based on rapid rural appraisal approach. In different regions where olive tree are implemented, farmers (70 groups) gave qualitative indications of olive tree field: density and age of plantation, estimated olive yield, annual crops cultivated in inter rows of olive trees and their productivities in such situation. Also, interviews were made with farmers, researchers, development agents to determine the importance, advantage and disadvantages of alley cropping based on olive tree. In parallel to this study, in different filed where olive tree are associated with other crops, we determine: density of trees, distance left from tree to cultivated crops in inter rows and general observations on crops and olive tree performances.

Main Results

In the investigated zone, results shows that 75% of farmers growing olive tree are also producing annual crops between tree rows. Those crops are: cereals (durum and soft wheat or barley), legumes –faba bean, lentils, pea, chickpea) and vegetables when irrigation is possible (potato, tomato, onion).Olive tree and cereals association are dominant (50% of cases).

According to farmer's estimations: legume crops like faba bean do not affect olive production comparatively to cereals (durum or soft wheat or barley). In this second case, olive production is reduced by about 39% when cereals are intercropped between the rows. However, farmer produces an added value of cereals or legume of respectively 9 and 7 qx/ha..





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1st EUROPEAN AGROFORESTRY CONFERENCE

October 9-10 2012

WHICH STRATEGIES OF PLANTATION IN ANTICIPATION OF CLIMATE CHANGE

Le Bouler H, CNBF – French Ministry of Agriculture
Sire F, AFAHC – Prom'haies Poitou-Charentes

Local tree species have to be favored for local plantations. False or True?

Often heard

- Local tree species results of hard genetic selections
- Regional provenance adapted to the local climate and soil
- Species and local provenance won't be adapted in different soils and climate

how will things turn out in the future?

- The general context predicts a plausible warming of 3-6 degrees over the twentieth century, accompanied by an increase in water deficit
- Do we have to continue to plant native species? If not, which plant? What will be the future climate?

Limits to knowledge

- The dates of changes and their real magnitude
- How will species react to these changes?
- There are limits against climate tolerance, primarily related to cold winters and summer droughts; climate change currently concerns the tolerance to summer droughts
- Some species locally in limits of tolerance appear very vulnerable whereas others are probably able to withstand water deficits significantly stronger

Define the climate vulnerability of local species for each homogeneous pedoclimatic region

Practices and policies that maintain genetic diversity

- Those of which tolerance limits are over plausible climate changes may continue to be planted
- For vulnerable species, the life expected for the planted species has to be analyzed: limit their place in the plants choice, but without their exclusion
- To reduce the risk of the decrease of species diversity in the future: introduction of current tolerant species to climate variation from the South to the North

Implementation of local genetic resources conservation policies

Links with applied forest research

A transnational approach is required for all work

AFAHC

« Rural trees and Hedges » - French Network

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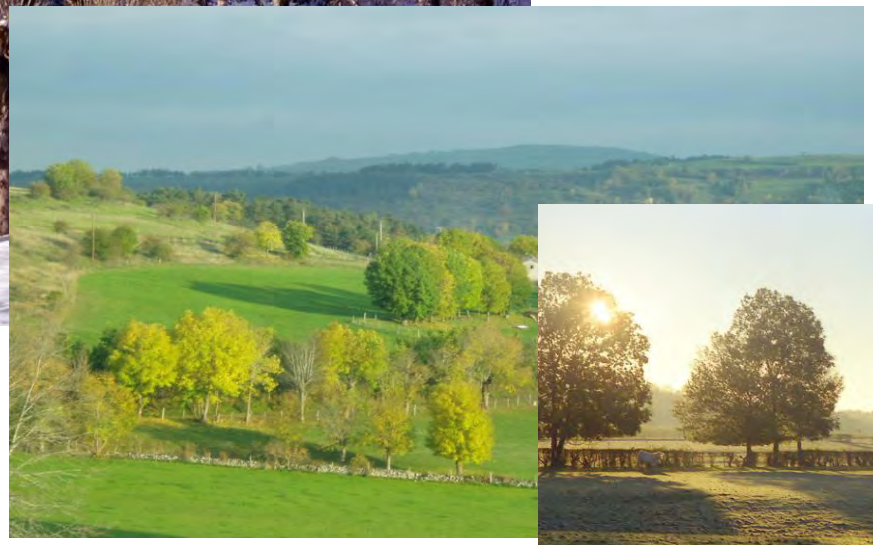

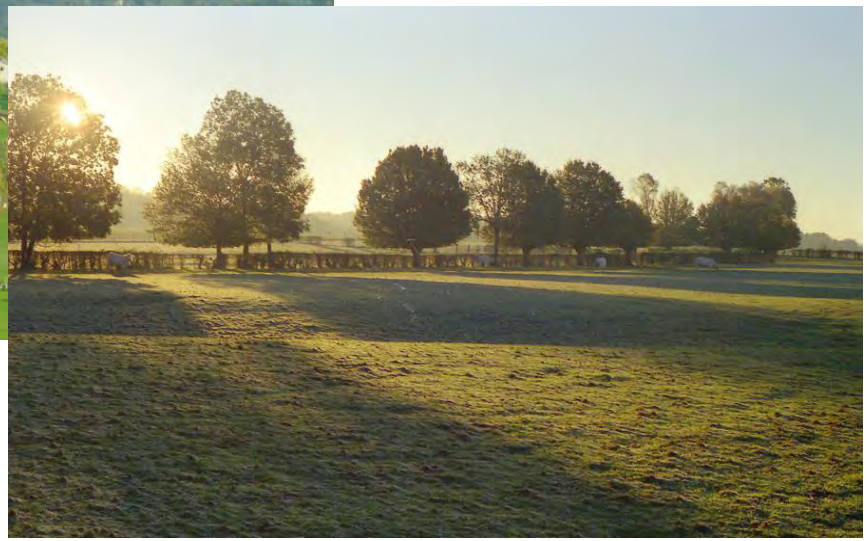

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FIELD TREES : A STABLE ECOSYSTEM DECREASING THE SENSITIVITY OF CROPS TO CLIMATIC VARIABILITY

1st EUROPEAN AGROFORESTRY CONFERENCE

9-10 October 2012

Béduneau J., Mission Bocage ; Gabory Y., AFAHC

Field trees : a stable ecosystem decreasing the sensitivity of crops to climatic variability

- Context
  - Water is now the limiting factor for agriculture : excess and lack
  - The agricultural productivity has to increase
  - The use of chemical product has to decrease

- European researches on the interactions between trees and culture in agroforestry systems

Field trees : a stable ecosystem decreasing the sensitivity of crops to climatic variability

The tree does not compete with the crop on water needs

- Water uses in agroforestries systemes:
  - The peak of drought of the soil surface:
    - delayed for a month
    - divided in half.
  - The establishment of the hydraulic lift phenomenon.
  - The roots collect nutrients and water where they are available, ie at depth below crops.

Field trees : a stable ecosystem decreasing the sensitivity of crops to climatic variability

- Water storage in agroforestries systems :
  - Infiltration increases by 30% in the dry season and 95% in the wet season
  - 200mm of water stored below a black poplar aged only 12 years
  - Improvement of the quality of infiltration water by reducing nitrate losses by 36%
  - Micro-climate creation by reducing plants water losses and wind

Reduction of runoff water, decreasing flooding risks and erosion of fertile soil layers.

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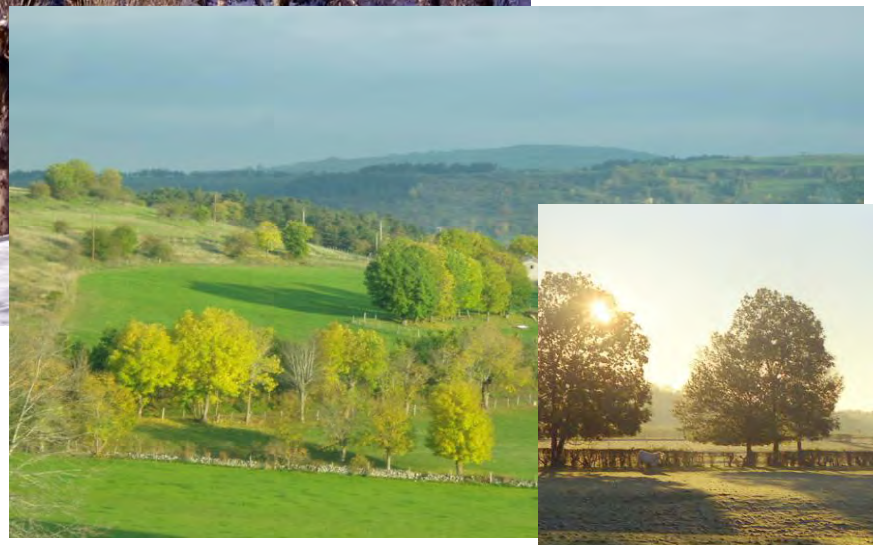

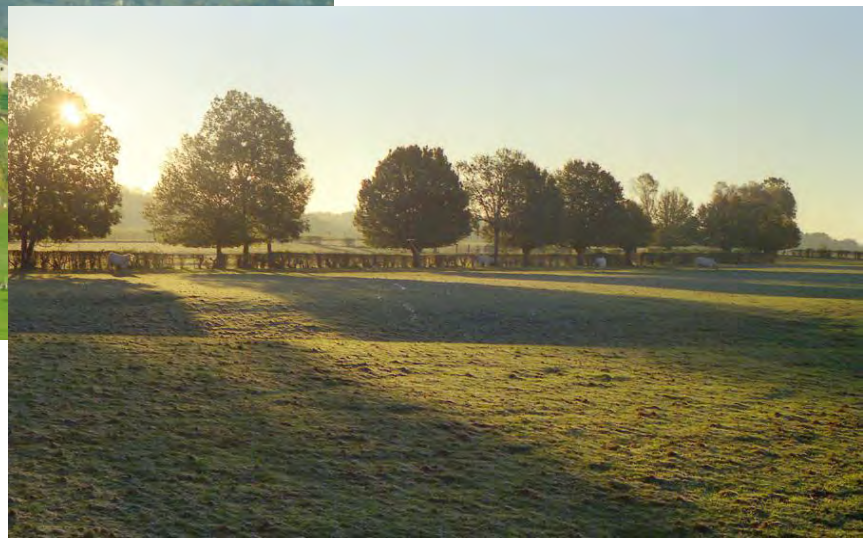

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1st EUROPEAN AGROFORESTRY CONFERENCE

October 9-10 2012

ECONOMIC DEVELOPMENT OF THE RURAL TREE BIOMASS

Vicet JC, AFAHC ; Guillet P, Forest and hedgerow landscape division, Chambers of agriculture of Pays de la Loire

Organize and manage the rural wood resource

- Know the resource
  - Usually a hectare of forest is equivalent to about one kilometre of hedge farmland ; a small resource in each farmland.
  - In France: 45 million m^2 of wood is burned every year, almost entirely used by private individuals.
- Economic interest
  - Because of the cheap price of fossils fuel over the last 50 years the rural tree has been mostly forgotten as a source of fire wood.
  - Only 50 to 60% of rural trees are exploited

Dispersed resources and individual local customers would not allow for a large enough market

Explore the whole economic potential of rural wood

- Improve wood boilers and automate supply
- Have machines to exploit the rural tree and convert woodchips
- Organize the production, storage, delivery, …
- Create safe and regular demand in the creation of wood boilers for schools, neighborhoods, gymnasium, administration building, …

These additional invests create local activity and may help the economy ; and, more technical installations regular maintenances.

Woodfield-energy and local development

- New kinds of cooperatives named Special Interest Cooperative Society (SCIC in French), based on the woodfield-energy, are being created in France.
- They can include 20% of capital stock from local institutions.
- The SCIC incorporate customers, SCIC employees and agricultural producers.
- Local institutions are heavily involved in the SCIC because they have hight-quality expectations forr for their public infrastructures

A SCIC must work both on economic efficiency and a social aspect. They participed actively in rural development

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Agroforestry in Flanders:
Range, opportunities & barriers

Bert Reubens & Bert Van Gils

First European Agroforestry Conference - EURAF

Institute for Agricultural and Fisheries Research
Plant Sciences Unit
www.ilvo.vlaanderen.be
Agriculture and Fisheries Policy Area

True agroforestry systems? Very sparse!

Obstacles?
Plenty!

Opportunities? Challenges?
YES!

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