

NEWSLETTER N°5, March 2020

1. Cropland Research Group GRA Co-Chairs message
2. Grazing Iberian dehesas: carbon sequestration offset livestock emissions
3. Agroforestry and wildfires
4. Special issue on the role of agroforestry on mitigating and adapting agricultural systems to climate change in the Mediterranean areas of Europe
5. Special issue on the role of conservation agriculture on reducing greenhouse gas emissions
6. AFINET handbook
7. Upcoming events

1. Cropland Research Group GRA Co-Chairs message

The March Cropland Research Group newsletter brings us several news that are able to help farmers and governments to reduce the impact of their activities in greenhouse gases emissions such as the paper explaining that agroforestry reduced fire risk that has been highlighted by the worldwide newspaper “The Guardian”. The recent paper dealing with N₂O modelling is also discussed to better understand the patterns of this greenhouse gases around the globe. Finally it is also mentioned the alive handbook where more than 400 farmer oriented abstracts,

factsheets and videos -translated to Spanish, English and Italian- dealing with economic, environment and social aspects of agroforestry implementation are presented. We also offer extensive information about those world meetings that have been postponed or cancelled due to the Coronavirus crises.

Wishing you health!

Source: Croplands Research Group Co-Chairs Team, Rosa Mosquera, Ladislau Martin-Neto, Mark Liebig.

2. Grazing Iberian Dehesas: carbon sequestration offset livestock emissions

The Iberian Dehesa is a good example of an agroforestry system with great natural value, which, together with high levels of biodiversity and a fixed population in rural areas, produces food with low carbon emissions, and could even have net carbon fixation.

Grazing land occupies more than two thirds of world agricultural land. However, there is still few data on how much carbon sequestration in both plant biomass and soil organic matter of grasslands can compensate the emissions of extensive livestock that graze different type of grasslands. Information about how much CH₄ can be oxidized to CO₂ in soil grasslands is still scarcer, while could be important in dry grasslands. Moreover in dry grasslands, the presence of trees and shrubs increase significantly the carbon capacity of the system.

The link between Climate Change and Livestock has made the Carbon Footprint a global indicator for evaluating and communicating the amount of greenhouse gases (GHGs) emitted by the set of processes required to produce the goods we consume. Beyond carbon footprint and meat/milk production, extensive livestock systems favour the conservation of multitude of seminatural systems and their biodiversity, and provide multiple ecosystem services. They provide foods while emissions are likely similar to the emissions that would occur naturally, without the livestock grazing, and biomass would be oxidized by wildlife or wildfires ([Manzano and White 2019](#)). We claim for an accounting model for Carbon Footprint that only computes the GHGs emission that would be avoided with the cessation of the production activity. Although we are still far of a fair Carbon Footprint Accounting Systems for extensive livestock, any step in this direction is welcome. Here we report a case study where the recent carbon sequestration measured for Iberian dehesas is compared with the emissions estimated for their exploitation, including livestock emissions.

Measuring C stocks in pasture soils and its change rate in the last 22 years, we have estimated that these soils have an average carbon sequestration capacity of about $0.83 \text{ t of C ha}^{-1} \text{ year}^{-1}$, a capacity that seems enhanced by the presence of cattle in the plots (Figure 1 (a)). That amount represents an annual C stock growth rate in pasture soils of around 11‰, well above the levels set by the "4 per thousand Initiative: Soils for Food Security and Climate" promoted by the Paris Climate Conference (COP21).

Following the "soil saturation" concept, which establishes that soils have a limited carbon storage capacity, we find that the soils of pastures initially poor in organic matter tend to have higher C sequestration rates than those of soils initially richer in organic matter. Figure 1 (b) shows how the modelling of this C saturation phenomenon allowed us to estimate that the potential C storage capacity of the pastures is around 2.8%, considerably greater than the current average content of 1.7%. This difference between the current content and the estimated potential content indicates that the pasture's ability to capture and store C in its soils can be maintained for many years.

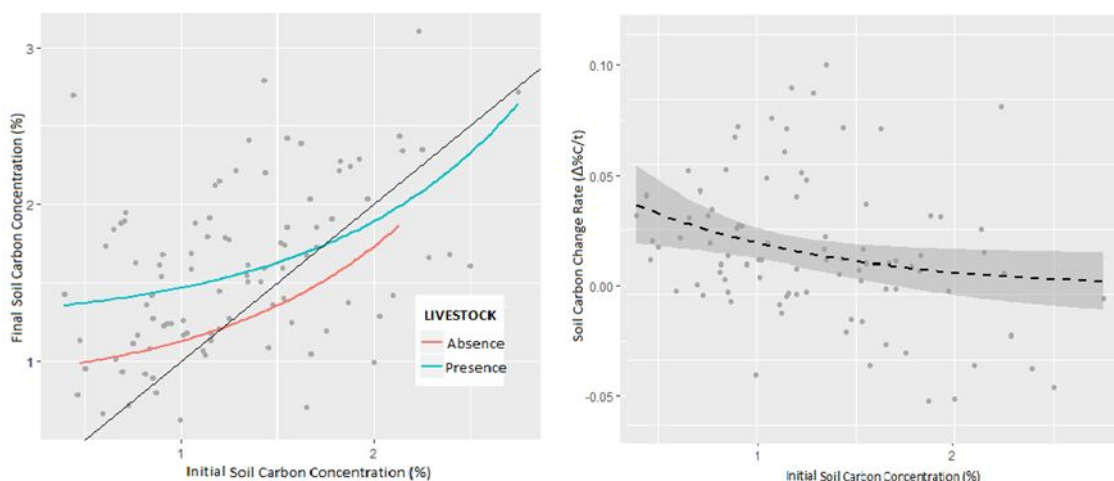


Figure 1: Soil carbon (%) in soils at the beginning and end of the study and the sequestration rate of C in the soil with respect to its initial C content (b).

Tree biomass stocks, both aerial and underground, and their change rates, were also measured using the National Forest Inventory (IFN) as a source of information. The rate of C sequestration for trees in pastures is $0.08 \text{ t of C ha}^{-1} \text{ year}^{-1}$.

The National Emissions Inventory of Spain establishes that when land use is maintained or specific soil conservation practices are not carried out, the organic carbon content in it remains unchanged. Our study offers grounds for thinking that this should be considered in another way, since it is rare to find ecosystems whose C stocks are in equilibrium. Their conservation, therefore, could be an interesting C sink that should be inventoried, among other things,

because that would imply enhancing the role of these ecosystems as mitigators of climate change.

In summary, the main C sinks of the pasture, soil and tree biomass, together sequester an average of 0.91 t of C ha⁻¹ year⁻¹, equivalent to 3.3 t of CO₂-eq ha⁻¹ year⁻¹. There are very few publications on GHG emissions associated with extensive livestock systems, and even fewer that associate such emissions with the use of the territory. [Eldesouky et al. \(2018\)](#) study extensive livestock systems linked to the pasture, estimating emissions ranging from 1.06 t of CO₂-eq ha⁻¹ year⁻¹ for beef production and 1.7 t of CO₂-eq ha⁻¹ year⁻¹ for sheep meat production.

We can conclude, therefore, that foods derived from extensive livestock farming linked to pasture agroecosystems can be considered, at least on farms, as foods that mitigate climate change.



Acknowledgments: Junta de Extremadura and FEDER Funds through the Research Project “Assessment of productivity and carbon sequestration in Extremaduran dehesas by using remote sensing: Estimation of carbon footprint for their market products” (Grant Agreement 150 IB16185).

Source: Mireia Llorente and Gerardo Moreno (University of Extremadura, Spain).

3. Agroforestry and wildfires

Every year we witness destructive wildfires taking a high toll on valuable natural resources, human lives and livestock, deterring environmental health and leaving desert, burnt landscapes behind. The scientific community places emphasis on studying this natural phenomenon, trying to find more effective ways to prevent, prepare and respond to the challenges posed, to reduce or even eliminate the risk. So, within this sphere of challenges, rises an important question: Does and how land cover types relate to forest fires risk? Agroforestry in particular? With this question in mind, a group of scientists (Christos Damianidis, Jose Javier Santiago-Freijanes, Michael den Herder, Paul Burgess, Maria Rosa Mosquera-Losada, Anil Graves, Andreas Papadopoulos, Andrea Pisanelli, Francesca Camilli, Mercedes Rois-Díaz, Sonja Kay, Joao H. N. Palma and Anastasia Pantera), evaluated the relation of land cover to forest fires incidents

and burnt areas. Using GIS to analyse LUCAS CORINE and EFFIS data, the team was able to evaluate the relation -if any- between the land cover type and burnt area, number of forest fires for six European countries (Cyprus, France, Greece, Italy, Portugal and Spain), taking into account each country's area. The study produced many useful results with the one on agroforestry outstanding: the answer is affirmative on the role of agroforestry to reducing forest fires. It is noteworthy to mention that even though agroforestry occupied only 12% of the studied area it was associated with only 6% of the fires. This outcome was an official confirmation to what all agroforestry people knew by practice: agroforestry, among others, can reduce forest fire risk by removing and reducing flammable biomass buildup, supporting stakeholders by its multiple products. Silvopastoral systems stand as a popular example of such cases where livestock feed on understory biomass, removing flammable stock buildup while producing quality dairy and meat products, supporting rural economy. The results of this study were published in the [Agroforestry Systems](#) journal and quoted by popular journals and magazines such as [The Guardian](#), and the [Italian Cosmopolitan](#) while it has been widely reproduced through internet websites throughout the world. Once again, it is proven that agroforestry is a win-win land-use option!

Source: Anastasia Pantera (Agricultural University of Athens, Greece) and María Rosa Mosquera-Losada (University of Santiago de Compostela, Spain).

4. Special issue on the role of agroforestry on mitigating and adapting agricultural systems to climate change in the Mediterranean areas of Europe

The [Agroforestry Network](#) of the Croplands Research Group of the Global Research Alliance launches a special issue on the Research Topic "[Can the Trees Save the Crops? Predicting the Services Provided by Traditional and Novel Agroforests in Changing Mediterranean Landscapes](#)", within the journal *Frontiers in Ecology and Evolution*. The main goal of this special issue is to bring together original research papers, perspectives, and reviews focusing on agroforestry roles in the Mediterranean areas.

We would like to encourage agroforestry researchers to contribute to this issue. All submissions will undergo rigorous peer review to guarantee high scientific quality and relevance to the subject. Ideally, we would like to receive abstracts (or a short description outlining your general idea) by **25th May 2020** and manuscripts for peer-review by **15th September 2020**. Once you show your interest through sending a message to mrosa.mosquera.losada@usc.es you will

soon receive an official message from the journal containing all the instructions for submitting a contribution. We think this research topic will be well received by the community and we would be honoured if you agreed to contribute. In case you are not interested in participating, but know someone that might be, please feel free to share this information with them. Thanks for considering and we look forward to your reply. If you have any questions, please do not hesitate to directly contact the Frontiers in Ecology and Evolution team (ecologyandevolution@frontiersin.org).

Source: María Rosa Mosquera-Losada (University of Santiago de Compostela, Lugo, Spain).

5. Special issue on the role of conservation agriculture on reducing greenhouse gas emissions

The [Conservation Agriculture Network](#) of the Croplands Research Group of the Global Research Alliance sent us this new about a call for conservation agriculture papers:

A special issue of the [Soil Science Society of America Journal](#) will be accepting papers on the role of conservation agricultural practices on reducing greenhouse gas emissions. The Guest Editors of this Special Issue are Craig Drury (Agriculture and Agri-Food Canada, Ontario, Canada), Chuck Rice (Kansas State University, Kansas, USA) and Jane Johnson (United States Department of Agriculture, Minnesota, USA). Thus far we have commitments for eight papers and we are hoping to receive 15-20 papers in total. The conservation agriculture practices that have been identified so far include conservation tillage, cover crops, crop rotation, residue management and irrigation. If you are interested in submitting a paper please contact Craig Drury (craig.drury@canada.ca) with a title and a list of co-authors by **April 30, 2020**. The paper submission deadline is **September 30, 2020**.

Source: Craig Drury (Agriculture and Agri-Food Canada, Ontario, Canada), Chuck Rice (Kansas State University, Kansas, USA), and Jane Johnson United States Department of Agriculture, Minnesota, USA).

6. AFINET handbook

AFINET ([Agroforestry Innovation Networks](#)) is a Thematic Network funded with 2 Million Euros by the European Commission aiming at promoting innovation through the involvement of 1000 pioneer farmers from 9 European Countries. They finally found four main challenges to overcome the technical and economical (business plans development, value chain sustainability) problems but also the improvement of society communication through the introduction of agroforestry concepts at all educational levels. Finally better policies are claimed to improve agroforestry implementation across Europe that should be linked to the new National CAP strategic plans. An [alive AFINET handbook](#) was created to help farmers to tackle these challenges and translated to English, Spanish and Italian languages. The handbook explains the most relevant concepts of agroforestry and provides excellent innovations to implement agroforestry across Europe. The AFINET handbook information is freely available and any agroforester can contribute to expand it by contacting afinet.usc@gmail.com. So, help us to expand your agroforestry innovation knowledge.

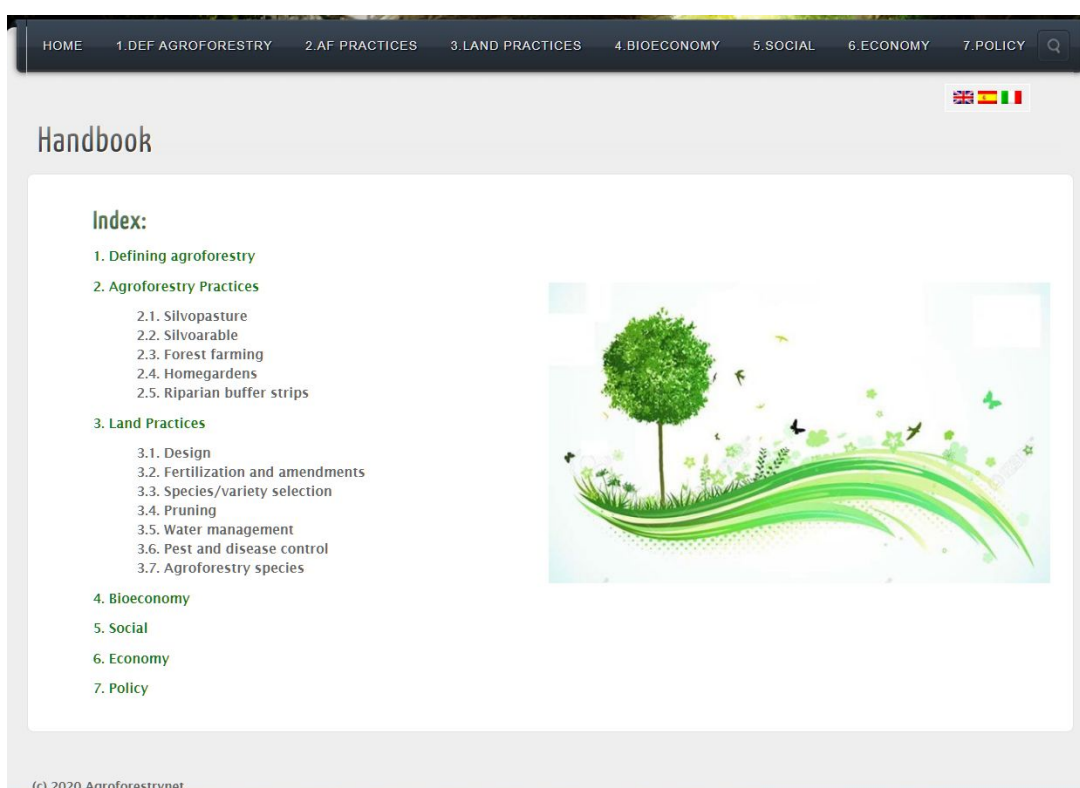


Figure 2: The alive [AFINET handbook](#).

Source: María Rosa Mosquera-Losada (University of Santiago de Compostela, Spain).

7. Upcoming events

Due to the global development of the Covid-19 outbreak some events were postponed. Please see below the new available dates:

14th European Farming Systems Conference (NEW DATE)

The 14th European Farming Systems Conference (IFSA – European Group) will be held in the University of Évora, Portugal, and hosted by the Institute of Mediterranean Agricultural and Environmental Sciences during **12th – 16th July 2020**. The main focus of this years' Conference will be Farming Systems Facing Climate Change and Resource Challenges. More information [here](#).

71st Annual Meeting of the European Federation of Animal Science

The 71st Annual Meeting of the European Federation of Animal Science will be held in Porto, Portugal, during 31st August – 4th September 2020. The program of this annual meeting will cover various areas of knowledge, such as nutrition, genetics, physiology, animal health and welfare, livestock farming systems, precision livestock farming, insect production and use, cattle, horse pig, sheep and goat production. More information [here](#).

8th ATF-EAAP Special Session

The 8th ATF-EAAP special session will be held in Porto, Portugal, on 31st August 2020 under the topic "What livestock has to offer to biodiversity and healthy soils". The session would like to engage discussion with farmers, industries, scientists, policy-makers and with the society. The outcomes of the session will be discussed with a large panel of European stakeholders during the ATF seminar in Brussels on 4th November 2020. More information [here](#).

XVII European Society for Agronomy Congress

The 17th edition of the congress of the European Society for Agronomy (ESA) will be held in Seville, Spain, during 1st - 4th September 2020. The main focus of the congress will be smart agriculture for great human challenges. More information [here](#).

18th International RAMIRAN Conference

The 18th International RAMIRAN Conference will be held in Cambridge, UK, during 14th - 17th September 2020. The conference will focus on developing strategies to maximise the efficiency of organic materials against a background of changing regulation, policy and market forces, as well as increasing pressure on the environment, soil quality and food production. More information [here](#).

VIII REMEDIA Workshop (NEW DATE)

The VIII REMEDIA workshop will be held in Elche, Spain, during **22nd – 23rd September 2020**. REMEDIA is a scientific network for mitigation of greenhouse gas emissions in the agroforestry sector and the main focus of this years' workshop will be the circular economy as a catalyst for sustainability environmental of the Spanish primary sector. More information [here](#).

5th European Agroforestry Conference (NEW DATE)

The 5th edition of the European Conference on Agroforestry will be held in Nuoro, Sardinia, Italy during **5th - 7th October 2020**. The conference will bring together worldwide researchers, practitioners, policy-makers, public authorities to discuss the role of research and innovation in agroforestry towards the development of a sustainable European Bioeconomy, while exploring its potential in fostering environmental, economic and social prosperity. More information [here](#).

28th General Meeting of the European Grassland Federation (NEW DATE)

The 28th General Meeting of European Grassland Federation (EGF) will be hosted by the University of Helsinki in Helsinki, Finland, during **19th – 22nd October 2020**. The meeting will give delegates the first hand opportunity to see and experience how today's state-of-the-art practices in grassland and ruminant production are utilised in Finland to produce milk and beef products that have been ranked as one of the highest quality products in the world. The meeting will be also the stage for you to represent and hear about the recent advances and novel approaches in grassland research. More information [here](#).

II World Congress on Integrated Crop-Livestock-Forestry Systems (NEW DATE)

The II World Congress on Integrated Crop-Livestock-Forestry (ICLF) Systems will be held in Campo Grande-MS, Brazil, during **3rd – 6th May 2021**. This congress is an excellent opportunity

for exchanging experiences and knowledge as well as updating on the latest research, development and innovation about ICLF systems around the world. More information [here](#).

This is your newsletter! If there's anything you think should be included, please send suggestions to mrosa.mosquera.losada@usc.es for the next issue

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