

Building multifunctional mosaic landscapes using vineyards for wildfire prevention

Designing an Agroforestry Mosaic Landscape by Introducing multifunctional Vineyard Firebreak buffers for Wildfire Prevention in La Plana de Manlleu, Catalonia, NE Spain.



View of a vineyard in Pla de Manlleu biodistrict (Catalonia)
Author: Angela Llop (Flickr) | © Educational use, non-commercial.



Vineyards acting as firebreaks in Mas Marés; Cap de Creus (Espelt Cellar)
Author: Anna Espelt | © Educational use, non-commercial.

/// Context ///

Rising temperatures and aridity in the Mediterranean Region have heightened wildfire risk and frequency, causing significant damage and expenses. Moreover, fire mitigation strategies often entail uncertain costs. Introducing firebreak buffers with low-flammability crops like vineyards in managed wildlands can mitigate wildfires while providing socioeconomic benefits, preventing rural depopulation, and promoting generational change. Furthermore, land use planning increasingly integrates complex agroecosystems to optimize ecological benefits and biodiversity conservation, aiming for economic-environmental balance.

In the Mediterranean region, the most widespread high-

value crop is wine grapes. Pla de Manlleu (Catalonia, NE Spain) is a rural and mountainous area with large forest masses and vineyards, designated as a Biodistrict, which is an innovative form of territorial governance. The inhabitants of this area work towards improving the quality of their environment, work and products. The vineyards in Pla de Manlleu are renowned for their exceptional quality and environmental contributions. Raïm +500, a farmer association, cultivates grapes above 500 m altitude across three municipalities. Their objectives include defining, preserving, and promoting the territory. The group initiated a project to create buffers with vineyards to prevent forest fires in the designated Biodistrict. Collaboration with firefighters aims to integrate the project with planned action systems.

/// Solution for a Resilient Future ///

Vineyard buffers represent progress towards multifunctional landscapes, integrating well with ecosystems compared to traditional fire management methods. These agroecosystems offer ecological and economic benefits, supporting societal goals and promoting innovation in landscape design.

In this context, the Raïm +500 group defines the essence of the Biodistrict as the zone composed of all lands located above 500 meters above sea level that belong to the Plan de Manlleu (Aiguamúrcia) and nearby municipalities. Approximately 50 families live in this area, with 45 of them exclusively dedicated to ecological and sustainable viticulture. In line with the biodistrict's definition, the Raïm +500 Zone is committed to a coherent

territorial model that is based on a homogeneous and compact natural area and is faithful to sustainability. The group focuses on three aspects:

- (i) Territory, aiming to establish a well-balanced, profitable, and resilient agroforestry mosaic.
- (ii) Cross-cutting economy, characterized by proximity and networking with other biodistricts and/or communities, with a clear emphasis on profitability.
- (iii) A vibrant and engaged community deeply rooted in and dedicated to the territory, actively safeguarding its heritage and well-being.

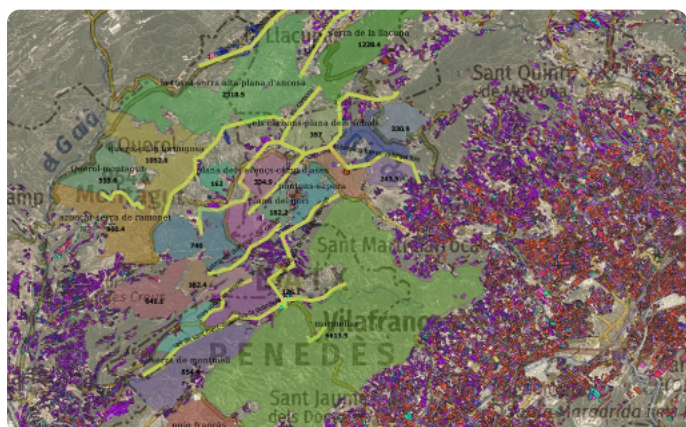
To foster the resilience of the mosaic landscape amidst the growing threat of wildfires exacerbated by climate

change, a project has been initiated in the Raïm +500 zone, later expanding to areas like Alts d'Ancosa. Initially, efforts focused on implementing the concept of mosaic agroforestry through forest maintenance initiatives and the collection of forest wood for composting or mulching in vineyards, aiming to sequester CO₂. Subsequently, attention shifted to forest management primarily around vineyard firebreaks to enhance their efficacy. Collaborating with Catalan firefighters, it was observed that consolidating financial resources for forest management and path maintenance around these vineyard zones could improve accessibility for firefighters, reduce fire intensity, and facilitate control efforts from within the vineyard perimeters.

The firebreak buffers primarily consist of aligned cultivated fields, notably vineyards, serving as protective

zones for residential areas and houses. In many agricultural regions, these buffers require consolidation and enhancement, sometimes integrated into road alignments and ridge paths.

Their designed forest mosaic comprises forested areas interspersed with vineyard firebreak buffers, with each forested area representing a maximum fire surface unit. This mosaic approach helps mitigate landscape devastation from fires, preserving the aesthetic appeal of the territory and sustaining its agrotourism and landscape value. It facilitates the identification of high-risk areas (such as Marmellar, Serra alta, Serra de la Lacuna) and pinpointing crucial locations requiring forest clearing or other costly interventions, given that vineyards are sustained by farmers if economically viable.



Mapping the planned vineyard firebreak buffers (lines in yellow) breaking forest masses in the Pla de Manlleu area.

Author: Raïm +500. Feature provided by Lluís Coll | © Educational use, non-commercial.



Catalan firefighters walking around the area affected by the fire in Cap de Creus

Author: Diari de Girona; Aleix Freixes (ACN) | © Educational use, non-commercial.

/// Always Moving Forward ///

The success of the Raïm +500 initiative is evident as quality wineries are increasingly sought after, with selling prices surpassing those in the rest of the region. Notably, since the inception of the +500 project around 12 years ago, there has been a decline in the average age of winegrowers, indicating generational renewal. The project of using vineyards as fire barriers in Pla de Manlleu is still in its early stages, but its success in other Catalan regions underscores its feasibility. Mas Marès (from Espelt cellar) lands have effectively integrated agriculture and nature over the past two decades, forming a sustainable

landscape and valuable agroforestry mosaic. They have created a resilient barrier against forest fires, with agriculture serving as a buffer zone, particularly shielding the urbanized area of Roses. Agriculture plays a vital role in establishing natural firebreaks, reducing fuel accumulation and enhancing fire management capabilities, as evidenced during the February 2022 fire. In Catalonia, initiatives like the Fire Wine project strive to enhance landscape resilience against wildfires, aiming to minimize losses. Specifically, this project will evaluate the innovation incentives within the wine sector's value chain.

Further information

- The Fire Wine project. <https://www.firewine.eu/en/> (Accessed in 16 April 2024)
- Agrupació d'Agricultors de El Pla de Manlleu. Raïm +500. <https://www.raim500.com/> (Accessed in 16 April 2024) (In Catalan)
- Viticultores de l'Empordà. <https://espeltviticultors.com/etiqueta/mosaic/> (Accessed in 16 April 2024) (In Catalan)

Acknowledgment / Contribution

A big thank you to Luís Coll from Raïm +500 for providing valuable insights into their initiative regarding the design of vineyard firebreak buffers and their farmer association in Pla de Manlleu.

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Co-funded by
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Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

Project co-funded by



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