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Representation of the Free State of Bavaria to the European Union

6th Forest Innovation Workshop

ECOMONTADO XXI AGROECOLOGY APPLIED TO THE DESIGN OF NEW *MONTADO*

Dates: 11-12 February 2025 | Location: Representation of the Free State of Bavaria to the European Union, Rue Wiertz 77, 1000 Brussels

http://www.forestinnovation.eu/

Objectives:

1) field testing of new techniques and innovative approaches to soil restoration and water use based on Keyline design;

2) assessment of the social, economic and environmental impact of the solutions implemented;

3) replication of the results acquired, from the experimentation carried out, for other cases where the same problem is identified;

4) dissemination of the results and their integration into the conceptual model of ECOMONTADO XXI;

5) dissemination of the methodology and conceptual bases associated with the techniques applied in the project.

Leader:

Sociedade Agrícola do Freixo do Meio, Lda. (SAFM)

Partners:

Universidade de Évora (UE)

Associação de Produtores Flores
Concelho de Coruche e Limítrofe

HERDADE DA MACHOQUEIRA DO GROU, CRL

The specific and global problems in the continental territory that the operational group aims to respond to are:

- Inefficient management and use of soil water;
- Soil loss and lack of soil in montado areas – desertification (environmental);
- The dynamics highlighted and worsened by the effects of climate change.

Ecosystem restoration techniques resulting from the concepts of Permaculture and Agroecology, such as the K-Line (“key line”) design, emerge as a solution to the widespread problem of soil loss and inefficient use of water seen in montado areas, as a measure for the integrated management of existing resources in agro-forestry-pastoral territories, namely soil and water.

The problem identified then creates the opportunity to implement a new method of restoring the soil, and consequently the entire ecosystem, through the development of an innovative technology directly related to sustainable forest management and the production of forest products (cork) of relevant importance in rural areas where montados are dominant.

Keyline system technique

Keyline method is a topographic line, on a contour line, drawn using as a reference point on the ground where the water, as it descends, abruptly slows down, resulting in a water accumulation area. Using this line as a reference, lines are drawn slightly (about 1 per cent in relation to the Key Line), to redistribute the water to the surface and storage of water in specific locations.

In this way, the water is distributed in the soil and progressively transported from the valley to the ridge areas.

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Keyline system technique

The Keylines are designed using a Yeomans plough, which opens furrows in the soil without any mobilisation, not disturbing soil’s life and minimise organic matter’s mineralisation rate.

The furrows can have depths of between 10 and 40 centimetres and are made with successive passes, each year in areas close to the previous furrow, in order to create soil and open up space for the plants' roots to develop.

Results

Monitoring of soil moisture

The effects of Keyline vary with topographical location. The results indicate that Keyline has effect on the moisture content of the soil, but that these effects vary depending on whether it is a higher altitude area, an intermediate altitude area or a lower altitude area.

In the upper zone, the results indicate greater moisture retention at depths of 10 to 40 centimetres in the period from March to July, when the reduction in rainfall begins to have an impact on soil moisture values. In the intermediate zone, the results point to a greater retention of moisture in the soil at depths of 0 to 20 centimetres. On the other hand, in the lower zone, the results point to a reduction in moisture retention at depths of 0 to 10 centimetres.

It can be deduced that the Keyline makes it possible to increase the soil's moisture retention capacity in the summer months, alleviating the effects of water shortages during this season.

Results

Monitoring of soil quality and pasturage quantity and diversity

Variations in the quality and quantity of pasture respond, although not very clearly, to changes in soil moisture.

Soil quality also shows variations that could be the result of a multitude of factors, namely variations in soil moisture, but also the number of cultivation operations carried out, the more or less expressive growth of pasture biomass, variations in soil pH, among other factors.

The project was carried out over just three years, so it wasn't long enough to reach any more conclusions. More studies on the subject are expected.

Dissemination

https://www.apfc.pt/xms/files/I_e_D/FichaTecnica_Ecomontado/Manual_Tecnico_do_Grupo_Operacional_ECOMONTADO_XXI.pdf