

# Forest landscape restoration in action

## Planning Document

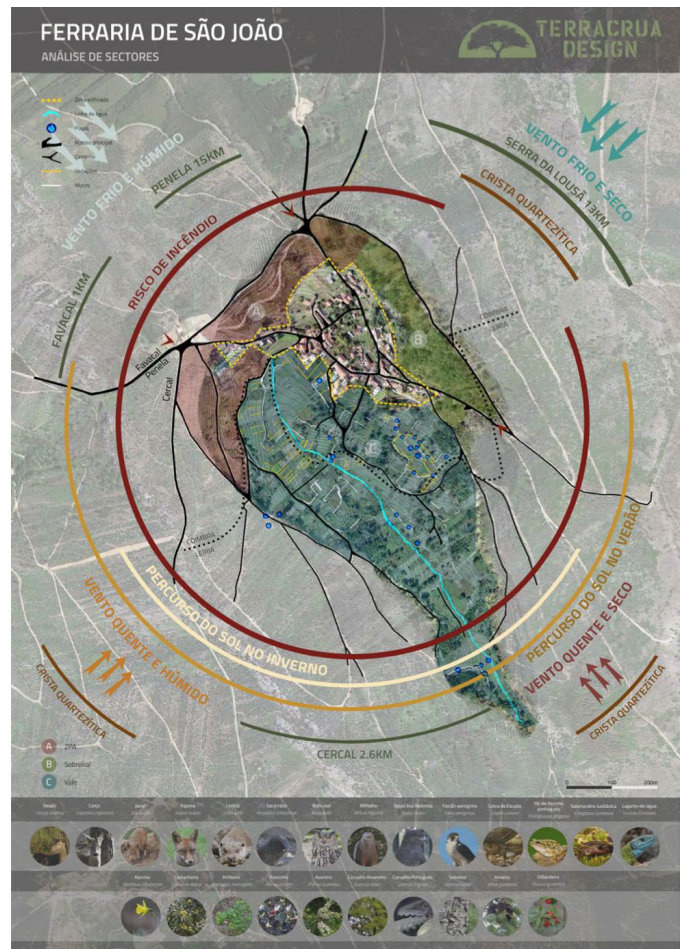
### Context

#### Key characteristics of the village

The village of Ferraria de São João is situated on the boundary between the municipalities of Penela and Figueiró dos Vinhos, in the district of Coimbra in central Portugal. It is located between the mountains Sicó and Lousã at 650m of altitude. The residential and agricultural areas of the village lie in a natural amphitheater of quartzite formations.

One of the main economic activities of the region is the production of Eucalyptus for the pulp and paper industry. The production in the village is characterized by the small-scale and, thus, provides a passive income. The production system based on monoculture, together with the lack of an adequate forest management, result in forest areas with a high forest fire risk.

Over the last decades, depopulation and pronounced aging resulted inevitably in the progressive abandonment of agricultural and forest activities. These circumstances had significantly negative effects, such as the fading of social and economic dynamism, the loss of local traditions, and the deficit of active forest management and, thus, exacerbation of the risk of forest fires.



In June 2017, the territory was devastated by forest fires that destroyed about 53,000 ha, including households and businesses, and caused the death to 66 people and injuries to more than 250. The village was saved from the flames on account of a small area with centennial cork oaks and other native hardwood trees that did not allow the fire to advance. Though, the surroundings of the village were completely destroyed.

#### Community Initiated Forest Management System

After the fires, the Association of Residents of Ferraria de São João started a participatory process involving the local population and forest owners to help defining the best actions to mitigate the risk and protect the village from damages caused by forest fires, save lives and safeguard private property. Realizing the vital role of the cork oak mixed forest in stopping the intense and severe fire, a decision was made to create a fire-retardant belt around the village that came to be called *Zona de Proteção da Aldeia* (Village Protection Zone).

<p><b>Village Protection Zone (VPZ)</b></p> <p>Establishment of a strip around the village of about 100-meters wide (total area of 15</p>
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hectares), in which the two highly flammable species - pine and eucalyptus - were uprooted (70 to 80 thousand) and replaced with autochthonous trees more resistant to fire, such as Chestnuts - *Castanea sativa*, Cork oaks - *Quercus suber*, European oaks - *Quercus robur*, Cherry Trees - *Prunus avium*.

The execution of the VPZ was carried out over about two years with own means of the local community and association and by volunteer work. The forest operations covered 9 of the 15 ha and were supported by the Municipality of Penela (e.g. machinery and respective operators). The financing was mainly through corporate and individual donations.

With this process came the need to define a long-term plan for ensuring sustainable regeneration of the VPZ and enhance traditional agro-forestry activities. This was achieved with the preparation of the **Masterplan for environmental, economic and social regeneration of Ferraria de São João** (Terra Crua, 2020). This has involved transferring the management of about 250 parcels of 80 forest owners to the local association (protocol for land management).

## Problems and suggested actions to address them

The restoration and regeneration of the VPZ fell short due to various difficulties and limitations, namely the following:

*method and practices used to implement the VPZ:* the eucalyptus and pine trees were rooted out by less knowledgeable experienced work and the soil was moved to form terraces. The absence of organic matter in the soil after these operations made the area prone to drought and, thus, inappropriate soil conditions for the introduced trees. This hindered tree's growth.

Moreover, an analysis demonstrated that the fire mostly comes up the valley in the direction north-south, and the way that the trees were planted would not allow VPZ to fulfill its functions if a fire comes from that direction.

*regulatory framework:* although this management model is foreseen in theory and in the law, regulation and mechanisms of support have not been put into effect and, therefore, the forest activities does not follow an explicit timeline and causes repeated interruptions in the development.

*sociocultural aspects:* forest owners lacking the same long-term vision and land ownership issues makes them reluctant in engaging with the new management model. Moreover, the lack of political and financial support weakens the importance of the initiative and demobilize stakeholders.

The suggested action to address these problems was to **give a boost to the regeneration of the VPZ by implementing the first phase of the Masterplan**. The complexity of the issues mentioned above called for specialized expertise: adequate knowledge and experience on forestry regeneration processes and on facilitation and moderation of participatory approaches. The action included three sub-actions as follows:

revisitation and (re)validation of the Masterplan with local community and forest owners and debate and define the priority interventions to execute the first phase of the Masterplan;

design of the defined interventions: retrieve the regeneration process by implementing a strategy for improved soil conditions using knowledge and experience on accelerated natural succession (boost tree's growth, improve soil fertility and water retention, and ensure fire-retardant function); expansion of the VPZ according to the Masterplan (based on an agro-regenerative setting and inspired on the principles of permaculture design, key-line design, natural agriculture, holistic pastoralism and biodynamic agriculture);

execution of the interventions, by hosting a tailored Bootcamp allowing to continue the process of reforestation with volunteer work. This initiative included activities of knowledge sharing (raising awareness regarding forests' economic and environmental value and the importance of their appropriate management for preventing forest fires);

## Planning

## Interventions in brief - technical features and main advantages

**Retrieve the regeneration of the VPZ by Accelerating Natural Succession** (eighth Permaculture Design principle).

Method: increase the levels of organic matter in the soil with the integration of “pioneer short-term species” within the existing matrix of “medium and long-term species” (ratio of 90% of the initial trees, planted with a close spacing, and left without irrigation).

Expected results: improve soil fertility and structure, fundamental to maintain soil functions (source of nutrients, water retention, carbon sink and biodiversity).

Next steps: once established proceed with coppicing and pruning regularly and leave the branches on the ground, either whole or chipped, the latter having better results in terms of soil fertility and water retention capacity, and in terms of reducing the risk of fire spreading.

**Expansion of the VPZ.** Implementation of the VPZ in areas other than the 9 ha covered initially (a plot of eucalyptus was cleaned and prepared for transition).

Method: a selection of eucalyptus was felled, that is, were cut instead of rooting out in order to avoid leaving the soil bare. The extracted biomass was converted to wood chips on site and added to the organic matter. This transition took place without compromising shade from the canopy, thus stimulating vertical growth.

Expected results: reduce soil disturbance, avoiding an alteration of its structure.

Next steps: introduction of pioneer species in the spaces between to support the medium and long-term species.

## Local community involvement

The local community was involved through a semi-autonomous facilitation method. By revisiting the Masterplan, it was possible to generate discussion regarding economic and ecological functions that needed to be set in establishing the zoning matrix. This was followed by the design of strategies and preparation of a proposal, which, in its turn, was shared with the community for feedback. After including all the necessary adjustments, and having the community's validation, the proposal had the conditions to integrate the master plan.

The local community was engaged in the decision of which zones were a priority and could be implemented first, which tools and materials would be needed, which trees would be introduced in the first stage and which sources could be mobilized to supply them.

Many discussions were held regarding fire dynamics to create the most accurate description of a fire scenario in the village.

The setting of the zoning matrix, was followed by the identification of plants, the analysis of their evolution over time and the definition of maintenance protocols.

In what regards the planning of the Bootcamp, it was accomplished mainly with the collaboration of the Association of Resident.

Throughout the preparatory period, the community was engaged in procuring materials and tools and organized themselves to feed volunteers during the Bootcamp.

During the preparatory events, there were sessions for the community and volunteers on how to propagate plants in accordance to the principles of the Masterplan using cuttings of existing vegetation.

These activities never succeeded in having the whole community engaged.

## Use of volunteers: forms of recruitment, training

The recruitment and communication with volunteers were responsibilities of the local association. The appeal to potential volunteers was done, mainly, through social media.

The number of volunteers in the Bootcamp was far less than what was expected, which compromised the operations, especially the training.

## Resources needs

**Documents:**

- Masterplan booklet, comprising the zoning matrix and the plan for its completion
- Resources table, including estimations regarding material and tools needed as well as the minimum number of volunteers to complete the implementation within the time allocated for the intervention.
- 'Working Book', comprising the maps with polygons and plantation lines and compasses
- "FSJ-Q-field" map aimed at helping the local association in the preparation of the polygons to intervene with geo-referenced data.

**Materials for plantation:**

- 1000 trees - 900 pioneers and 100 medium-term trees in forest trays
- 2000 cuttings for pioneer bushes
- 7m<sup>3</sup> of compost
- 37m<sup>3</sup> of wood chips
- approx. 30 Kg of seeds

**Machinery:**

- Auger ground drill
- Wood shredder
- Chainsaw

**Hand tools:**

- Digging shovel
- Forks
- Iron bar
- Gloves

**Others:**

- Signaling tape to mark the polygons
- Walkie Talkies
- Reflective vests

**Human Resources:**

- Project coordinator with soft skills so that concerns were considered and adjustments were done according to needs expressed.
- Implementation coordinator able to communicate effectively with different teams and coordinate their joint efforts.
- Registrar responsible to manage volunteers, registrations and logistics (e.g. accommodation their lodging and dietary needs)
- Procurement responsible for gathering all materials needed
- A monitoring person that can map everything that was done and update the project as it develops

**Financial Resources:**

- Around €3 000 in materials in the first intervention
- Around €11 000 for preparatory visits and Bootcamp planning and implementation (e.g. costs with transport and meals).
- If skills in propagation and in designing planting schemes continue developing, both the expenses with plants and with the involvement of specialists is reduced substantially.
- Once autonomous in plant resources and after gathering skills to manage their systems, the costs of intervention (e.g. material and volunteers' logistics) will drop dramatically.

