Bootcamp Report

EXECUTION/INTERVENTION

Transition of an eucalyptus plantation to a policultural, multi-layered, permanent canopy cover forest system

MAIN PURPOSE

The Village Protection Zone (VPZ) is meant to create a buffer zone of hydrated, fire-retardant vegetation around the village's infrastructure and agricultural fields. As some eucalyptus plantations still intersect the planned buffer zone, the main purpose of this intervention is to implement a transition process of a eucalyptus plantation to a sustainable forest system without rooting out the trees, instead, use them to accelerate the new system's development.

FEATURES

To achieve the expected learning outcomes, a process of exchange was held with the local community and other participants to explain the dynamics of the current forest system and how the interventions were going to be implemented to achieve a new forestry pattern.

One of the main rules was minimizing soil removal and the number of posterior operations in order to avoid soil degradation problems. The exception was the creation of infrastructure to improve the access to water and to contribute to increase the efficiency in the passive rehydration of the landscape. This also means that when the eucalyptus were cut, roots were not pulled out but kept in the ground.

The fertility of the soil depends on the level of organic matter, and this, is generated by vegetation and animal interactions on the ground. Therefore, the generation of organic matter and, thus, increased soil fertility can be facilitated and accelerated by leaving the pruned and shred branches and leaves in the soil surface. As organic matter (leaves, bark, roots) enters the soil, it also increases its ability to retain water.

Another important aspect is to preserve the canopy by selective felling as to ensure that the soil has enough shade to reduce water evaporation and that the new system is protected from climate extremes by allowing evapotranspiration and condensation (when it's hot, the canopy evaporates water, cooling the air around it, and when it's cold the water condensates on the canopy, raising temperatures locally). Besides, the canopy can capture great amounts of water from condensation, and the drips on the ground are held until the water is needed.

The new trees are gradually introduced as the system's conditions change over time. In the first stage, 90% of the new system was composed by pioneer and/or support trees and bushes characterized by handling well the pruning and coppicing to keep the soil covered and consolidate it's structure. As the biomass of these pioneers is transformed into the soil, new species for medium and long-term purposes can be introduced until the ratio is down to 10 - 20% support species against 80 - 90% productive.

TIMING

The mosaic is designed with the climax forest in view. The mid-stages, where pioneers are still dominant, are specifically designed to create the conditions necessary for the final composition. These can be considered as transitional stages, where the cycles of maintenance, as well as infrastructure and accesses, are carefully thought to ensure that every piece of land receives as much attention as it needs.

Pruning and shredding are performed in mid-Fall, still allowing sunlight to reach the new trees and wood chips to absorb and hold water during the rainy season.

The cycles of the different mosaics are integrated into a matrix of continuous plantation and felling. This ensures the balance between the diverse outputs of the forest system, the preservation of the canopy and a multi-aged system.

PARTICIPANTS

In the pre-Bootcamp event for the preparation of the polygons guests from other nearby villages and a group of scouts joined the members of the local community.

METHODS

Plant lists were created for the zoning matrix, considering the final composition of each plot of land, and the intermediate vegetation needed to change the conditions on-site as to accommodate the final intended forest composition. In this context, multi-functionality is of key importance as this new system should accommodate all the forest functions: social, economic, environmental, ecological and cultural.

The trees were placed in the landscape according to their needs (e.g. water and soil and maintenance).

The boundaries for the polygons to be intervened were marked to avoid damaging inadvertently other trees during operations.

The operations included the coppicing and/or shredding of pioneer and support species into wood chips, the cutting with a chainsaw of all the oxidized branches hanging in the air into smaller pieces, and placed on the ground to create a nutrient trap.

Existing eucalyptus trees were marked into categories: some were good for selling the wood, others to be shredded and turned into wood chips, and others are to leave standing to keep the canopy as tight as possible.

OUTCOMES

By the end of the activities, the polygon was prepared for the Bootcamp interventions. Nutrient traps were built for regrowth with materials found on-site. Pioneer species were coppiced while the canopy was preserved.

Intervention for restoring the existing VPZ

MAIN PURPOSE

VPZ's implementation in 2018 was done under the premise that eucalyptus are dangerous and should be completely removed. However, they were replaced by other forest species without support or pioneers that could re-condition the soil first. This led to stunted growth and soil erosion.

The main purpose of this intervention was to create a multilayered forest system out of an existing plantation matrix, namely by the introduction of pioneer and support species to help in the system's recuperation.

FEATURES

Technical exchanges on natural succession were held to explain that a forest doesn't naturally grow starting with the final dominant species. It should be understood as a dynamic process in which

plants create conditions for the next species to thrive. Accelerated succession is the principle in which those conditions are created artificially (human intervention).

A planting scheme and illustrations were prepared and shared with volunteers, explaining how trees were going to be introduced.

The volunteers were divided into teams to dig holes, plant trees, add compost and mulch, and prune flowers and branches once planted.

TIMING

The interventions were divided in two periods: before and during the Bootcamp.

Before the Bootcamp, polygons and tree lines were marked and plant cuttings were prepared. Their tips were soaked in water with rooting hormones (which can be made naturally with salix) for one to two weeks, encouraging root growth before planting.

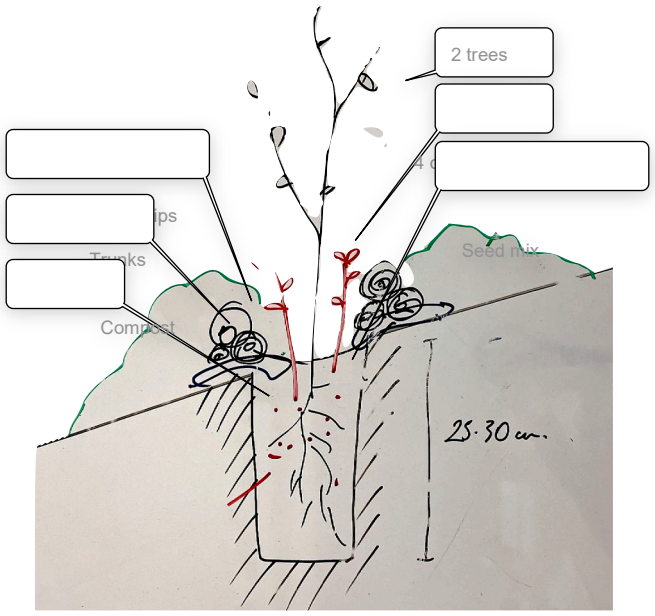
PARTICIPANTS

The intervention had support of local community members and volunteers from neighboring villages.

METHODS

As volunteers were not supposed to use machinery, they were responsible for planting operations accordingly to the scheme previously defined.

After sections were planted, a team was tasked to organize thick branches in segments of 20-40 cm around the trees to form a "nest".



Simplified schematics of model "nest" - Feb 27th

One other team would add a measure of compost to each tree niche and another would deliver compost for mulching, ensuring that compost and branches remained mostly covered.

Cuttings were added to the nest to protect the young tree from animals and adverse climate elements.

Seeds were prepared for germination (boiled, frozen, or scraped depending on species) and mixed with clean sand and compost tea. This was done after planting the cuttings. Puncturing the soil with the cutting can push some seeds too far into the soil reducing the overall germination rate.

OUTCOMES

After the Bootcamp intervention in the VPZ approximately 250 fruit trees were planted and around 600 cuttings were placed on the ground together with 3kg of seeds.

Rural community participation

During the planning and preparation phases, the community contributed with their observations, past experiences, visions for the future, and possible solution scenarios.

The physical experimentation of the concepts was agreed to take place in plots of land belonging to the local association. If experiments are successful, then other landowners could participate in the transition and maintenance process.

Model "nest" - Feb 27th

It is thus of vital importance that all efforts are made to implement systems correctly, using appropriate design tools, techniques, plants, and materials.

Participation of volunteers

Volunteer participation was not ensured. The low number of volunteers at the Bootcamp increased substantially the number of work hours needed to complete programmed operations. The learning-focused sessions were reduced to introductory conversations and informal exchanges during the weekend.

OUTCOMES & LESSONS

Main outcomes/ achievements of the interventions

The main outcome is the change of perception. A conceptual Master Plan had been developed together with the local community and, as there are some more abstract components and difficult to envision it is important to demonstrate them and their good results. This is an important example of how a transition from an eucalyptus system could be initiated, or how the processes of natural succession can be used by rural communities to create regenerative and economically viable forest systems.

Lessons learned

The planned outcome of the interventions was hindered due to miscommunication and mismanagement of resources and time. Clear communication channels are very important.

The resources needed for the plantation were not met, requiring the reduction of the scope of the implementation. In this case, options should be taken as to reduce the implementation area even further or improve the outreaching to volunteers and materials' sourcing.

The main stakeholders should participate in the event's communication and dissemination, as to ensure the presence of as many volunteers as possible, and the sourcing of the appropriate equipment, food, and accommodation.

The plant list that was exhaustively developed was not taken into consideration and the sourced trees were inappropriate for the purposes of implementing the first phase of the Masterplan (90% of the plants should pioneer and / or support species). This greatly increased the amount of work to plant them, as it was not planned, and the risk of failure of the implementation of this regenerative process.

Future prospects regarding local community

The local community needs to continue developing their ideal ecosystem (forest, milking goats, orchards and plots with several kinds of cultivations, such as vegetable gardens) in a way that promotes diversification into new activities and new income sources, that ensures protection against forest fires, that revitalize traditional activities and cultural patrimony and that improve the quality of life.

At this stage, it would be beneficial to build up on mutual and collective motivation to participate in the joint management model wholly initiated by the local community, and create appropriate mechanisms to monitor and evaluate the progress of the restoration and regeneration of the forest area and landscape. In the end, the local community and forest land owners need to critically assess their experience and capacity to adapt to new circumstances.

Support from other stakeholders

The support of the municipality is of vital importance, mainly in the early stages of the VPZ implementation, by helping to manage the bureaucratic boundaries and create agreements and protocols between the local association and forest land owners, by facilitating the political line of reasoning for assuring regulation and support mechanisms, and by supporting with appropriate materials and machinery. To be noted that the initial stages of such a process is resource-intensive and require dedication and commitment.

Monitoring and surveying with GIS technology can be of interest to the municipality, and serve many other villages and organizations with valuable information on how to create community forest management models that are sustainable from the economic, environmental and social perspectives - initiatives of an inestimable importance given the problematic associated with forest fires in Portugal.

Main constraints to achieving the expected results and how to overcome them

The VPZ's main constraint is the social and cultural issues related to land ownership that hinder a more effective intervention and results.

It is important to achieve consensus on how the land is to be managed and to define accountabilities, shared responsibilities, and roles.

Main recommendations

- Collective decision-making and planning. Listen to concerns and integrate them. Discuss common needs and strive to come up with ways to address them.
- Agree on land that will perform ecological functions, such as ridges, waterlines, steep slopes, road buffers, hedgerows, etc. Map them and assess the potential for economic functions.
- Choose plants and other elements carefully, the more functions they perform the better: firewood, mushrooms, beehives and honey, harvest timber, feed cattle, etc.
- Design for low maintenance, e.g. think of ways animals and environmental factors can work for the system.
- Think about access and water and how they can work together to move water to where it is most needed. Be mindful of how water naturally flows in the landscape, design systems that slow water runoff, spread water throughout, and soak it in the soils. Trap as much water and nutrient as possible as it flows down the system into the water lines.
- Design taking time and space into account. Think of how all the elements will grow together so that is possible to have flowers, fruits and other products all year round, and for generations to come.
- Start small and slow and build on collective knowledge and experience, and adjust accordingly to the changing context.
- Plan interventions that use minimum work and energy. Create collaborative strategies as much as possible.
- Build on the existing system (e.g. replace eucalyptus or acacia reflecting on how they can be used to foment and support the new system).

- Use locally available resources (e.g. create a small nursery and propagate plants instead of purchasing them).

NEXT STEPS

Currently, the VPZ needs a concrete plan for the implementation and maintenance of the subsequent phases of the intervention, identifying priority actions, responsibilities, and calendar for implementation. Notwithstanding, this process is dependent of prominent aspects, of which it is highlighted the need for a formal agreement between the local association, the local community, the forest land owners, the municipality, and other relevant stakeholders on how to manage the VPZ (definition of objectives, domains, responsibilities, and individual roles.

For the expansion and sustainable forest management, the local community already has a guiding long-term plan, enclosed in the Masterplan.

Contract No AGRI-2019-409 supported by the European Union contributed to the results presented in this document. The opinions expressed are those of the contractor only and do not represent the Contracting Authority's official position.