TERRACRUA DESIGN

March 2022 Bootcamp Report

This activity report is composed of two parts:
"PART I" is a summary of the points or strategies to change/rethink.

"Part II" is a detailed description of the conditions/circumstances leading to this assessment.

Any questions about this report or the work carried out by Terracrua in Ferraria de São João can be clarified by contacting:

André Carvalho

Email: andrenscarvalho@gmail.com

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PART I

Synthesis

MARCH BOOTCAMP OBJECTIVES

This Bootcamp was experimental in nature. It served to experiment a planting method with a certain choice of plants for Ferraria de São João.

1. Test nest planting method in Ferraria de São João✓
2. Experiment and evaluate constellation of pioneer/support plants to stimulate regeneration of existing VPZ✗

   It was not possible to experiment species consociation. When the work started, the requested species were not available (see Necessary Plants for March Bootcamp page 6; Workbook, page 14).
3. Evaluate the planting method✗

   It has not yet been possible to assess whether the planting method is suitable for the location.
4. Try the tools available for the management/transformation of the VPZ✓

   A. **Forest Biomass Crusher:** The shredder that was made available by the Municipality of Penela was not able to produce the required amount of forest biomass in a timely manner. (in 3 hours of work, the shredder produced only 0.01m³) ✓

   B. **Drill:**The drill motorbike did not serve to make the hole to its full depth. It served to make the markings of the measures and to start the pit. Depending on the location, the drill could reach depths between 10 and 20 cm.✓
5. Experiencing the infrastructures and roles associated with managing volunteer activities✓

WHAT WOULD BE DIFFERENT AT THE NEXT BOOTCAMP:

A. Preparation of Intervention Areas

1. Marking planting lines with more accurate instruments
   - *Improve alignment with existing vegetation*
   - *Try to keep the minimum distances between lines in order to find the most suitable sun exposure for the chosen species and ensure convenience of subsequent maintenance* ⚠
   - *Seek to follow the "key line" pattern with a view to passive rehydration of the plantation*
   - *Prepare the pits before the intervention* ⚠
2. Timely preparation of polygons (see First Preliminary Meeting for Bootcamp)

B. Materials

3. Resource placement (chip, compost, blueprints)
   - Outside the polygons, close to their boundaries and in a suitable location for wheelbarrow distribution ⚠
   - Resources in each intervention polygon, distributed proportionally over a canvas ⚠.
4. Reduction of polygons for available materials. As it was not possible to acquire all the materials, it was decided to reduce the total area of intervention, in proportion to the materials available. ⚠

Project Critical Line ⚠

Element or task that enables other project elements or outputs

C. Plants

6. Make large stakes (30cm) for the support trees to increase the contact area with the ground and increase the probability of rooting
7. Direct communication between specialist technicians and nurseries in order to efficiently reach a list of plants suited to the ecological functions to be performed, and the stages of natural succession expressed on site ⚠️

D. Responsibilities

8. Delegation of operational responsibilities to ensure the necessary conditions for the execution of Bootcamps. ⚠️
9. Delegation of responsibilities for monitoring/ observation and weekly assessment of the plantation status ⚠️
   - Check level of humidity in the nest
   - Check foliage and identify signs of water stress (water when needed)
   - Photograph and maintain technicians and others involved in progresses
10. Delegation of perennial nursery maintenance responsibilities ⚠️
    - In summer, water the cuttings to be rooted daily, reducing the frequency until watering once a week in winter. Increase watering frequency in summer (1 x day). Repeat.
    - Continued expansion of the nursery up to 10,000 plants
    - Continuation of the cutting of the species in Ferraria and surroundings
    - Continuation of seed harvesting and storage in Ferraria and surroundings

Main constraints of Bootcamp March Operations

8. Polygon preparation was not complete
9. Lack of clarity on the roles played by the team in Ferraria de S. João.
   - Who is responsible for acquiring materials, tools, blueprints, etc.?
   - Who is responsible for communicating with volunteers?
   - Who is responsible for coordinating volunteer activities?

Communication failure in the purchase of trees: there was no confirmation of the final list before purchase

1. There were not enough materials (biomass and manure) for the number of proposed nests and these resources were not well positioned
2. The number of volunteers was less than necessary
3. The additional energy needed to complete the assignments has pushed thematic conversations to the background.

Management and Mitigation of Plantation Damage

Since the planting did not go according to plan, in particular the plants available and the number of volunteers, some measures had to be taken to prevent damage to the plantation:

1. **Existing nests:**
   - **Do not move the nests until October** ⚠️

     Water once a month, or every 15 days in summer. The first irrigation in June if there is no need (forest biomass and nest are still damp close to the ground)
   - Choose a person/group to observe the plantation weekly
   - Check the humidity under the nest and in soil next to the plants
   - It should be the same person or group to maintain a point of reference
   - Look for signs of water stress and change irrigation plan accordingly
   - During the initial phase, take the flowers so that the tree does not produce fruit and focus on gaining height.

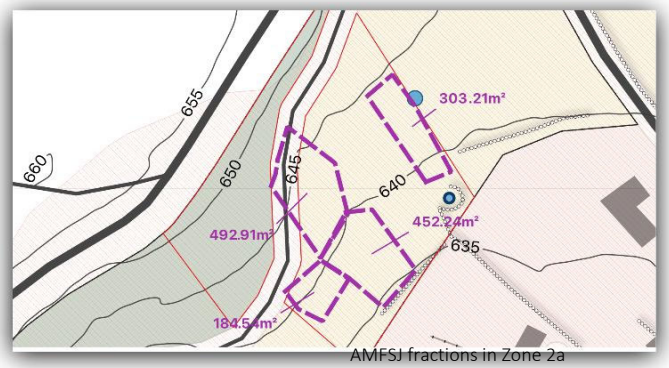
2. **Create more nests in April:**
   1. Add intermediate nests between the existing ones with: Broom ⚠️, Tagasaste, Arruda in the lower areas, Rosemary and Lavender in the upper levels.
3. **Sow still in April:**
   - Assorted Tomatoes and Marigolds (Tomatoes, like other nightshades, have strong scents that repel mammals)
4. **At the top of the implementation area, next to the half-slope access:**

Make a manure and biomass booster in that order.

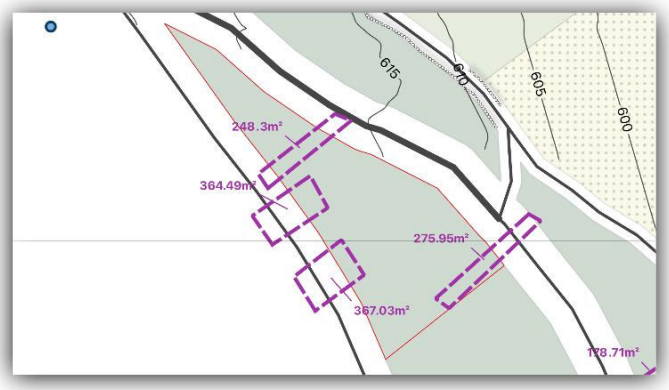
5. **Seal the implementation area.**

PART II

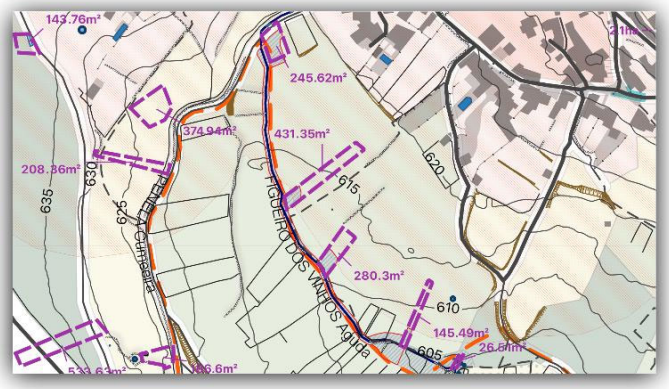
March 2022 Bootcamp Report - Detailed



AMFSJ fractions in Zone 2a



AMFSJ Fractions in Zone 4d



AMFSJ Fractions in Zone 5a

FIRST PRELIMINARY MEETING FOR BOOTCAMP

JANUARY 19 TO 21

GOALS:

- Submit Master Plan
- Present Bootcamp March 2022

In a first visit to prepare the Bootcamp, the Master Plan was presented and clarified to the local community; and information on the intention to proceed with the intervention in 3 areas of the Masterplan was provided.

The meeting served to achieve a common understanding on the approach to be used.

Model Nest - February 27

A. Areas to be implemented

B. Strategy and technique to use

C. Necessary actions and resources

C.1. Actions and Resources Considered Necessary for the Phased Implementation of the Master Plan

C.2.Actions and Resources Required for the March 2022 Bootcamp

C.3.Plants Required for the March 2022 Bootcamp

A. Areas to be Implemented

Taking into account:

1. The experimental nature of this intervention

The absence of a clear agreement/contract between ARFSJ, the municipality and forest land owners It was decided in the sessions that Terra Crua (TC) would facilitate the development of the Master Plan, and the experimental method would be carried out on the local association's land

During this visit, the proposal to work only on AMFSJ property was presented and agreed upon until conditions allow to expand the actions to the lands of other owners. We found 3 different areas where we could build prototypes with AMFSJ terrain:

Zone 2a: VPZ next to the village to transform into a mixed grove/orchard; Zone 4d: Intensive Eucalyptus with some sapling to transform into VPZ; Zone 5a: area next to the stream to be transformed into Riparian Gallery.

It was also decided that it would be necessary to prepare the polygons:

- Mark the polygon with tape or rag
- Clean the polygon with a Brushcutter
- Clean and organize dry leftovers and cutting with a chainsaw in order to use them for nests
- Prune the side branches and shred the remaining greens
- Mark planting lines 3m apart
- 1.5m planting bar marking
- Total or partial opening of the pits
- Remove planting lines
- Distribute the chip and the composite along the intervention polygons

B. Strategy and Technique to Use

The strategy for transforming polygons as follows:

- **Stimulated/Accelerated Natural Succession:**

1. Introduce species from the various stages of succession and stimulate the next stages
2. Accelerate the return of woody materials to the ground and sun exposure through pruning and grinding and organization of leftovers near the nests
3. Start the system with 90% support species and 10% fruit trees. Gradually transition to 10% support species with 90% fruit trees.
4. These 10% of starting fruit bowls:
   - They can be very diverse in order to try out which varieties adapt best over time.
   - They should primarily consist of drought-resistant varieties that respond well to pruning (or deer cracking)

Stakes - March 27

The ~550 fruit trees - March 16

Nest plantation

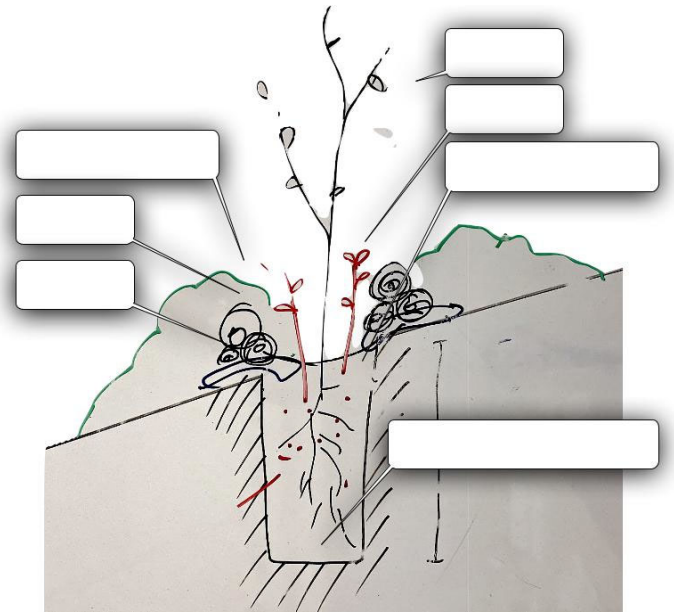
- The circular pattern has proportionally the largest area by smallest perimeter. It is the standard used to conserve and reduce moisture loss to the outside, and to reduce the impact of external forces inside the nest (wind, solar exposition, frost, etc.)

Building a Nest

1. Brief cleaning in the nest area
2. Dig up to 25 to 30 cm deep. Ensure that the bottom of the pit is 'loose' and not compacted by machinery or excavator. The pit is easily opened with the initial use of the drill/drill with iron bar and digger finishes.
3. Insert two trees into the pit, a final tree and a support tree
4. Weed or weed support plants that already exist around the nest.
5. Add about 15 liters of cured manure in the area around the planted trees. Be careful not to touch the material to the trunks, which may cause rotting.
6. Add logs and other wood on top of the manure
7. Add about 1/2 to 1 wheelbarrow of forest biomass per nest.
8. Add 4 or more cuttings to the nest.

These will serve to protect the young tree from wind, frost and solar exposition. Use species that propagate well by cutting, have fast growth and strong smell.

9. Mix different seeds with wet washed sand and add to the center of the nest (the wet sand allows the seeds to mix more evenly. Without the sand the smaller seeds sink to the bottom of the container, while the large seeds stay on the surface making your distribution uneven by hand. Make sure this is the last step before watering. Placing stakes after the seeds can move them to other depths, jeopardizing their germination.
10. Water carefully. Plants should not be watered close to the stem. The plant biomass of the nest should have priority in watering. The greater the layer of biomass, the longer the plantation can last without watering.



Simplified nest planting scheme

House of Tools - March 24

Forest Biomass - March 24

Digger - March 26

C.1. Actions and Resources Considered Necessary for the Phased Implementation of the Master Plan

- ARFSJ lands prepared for implementation (see First Preliminary Meeting for Bootcamp)
- Establish a nursery for the propagation of perennials with a capacity of 10,000 plants
- Work and negotiate with the inhabitants the construction of the lease/management contract for the VPZ for the future expansion of the VPZ
- Acquisition of a forest shredder for the production of forest biomass
- Collection of seeds and cuttings from the local gene bank

C.2. Actions and Resources Deemed Necessary for March 2022 Bootcamp

- AMFSJ lands prepared for implementation (see First Preliminary Meeting for Bootcamp)
- 2000 stakes of specimens existing in Ferraria (Amoreiras, Elderberries, Willows, Rosemary, Lavender, etc.)
- 1000 trees in forest alveolus
- 37m³ of forest biomass/chip distributed proportionally by the intervention areas
- 7m³ of compost/manure tanned with canvas underneath distributed proportionally by the intervention areas
- Minimum Number of Volunteers: 34
- Meal Logistics
- Possibility to stay overnight

It would be TC's responsibility to create:

1. list of plants
2. List of materials and tools needed
3. Program for the 2 day Bootcamp.

C.3. Blueprints Needed for March 2022 Bootcamp

A. **Trees and shrubs in forest alveolus from nursery;**

Support Species: Tagasaste, White Broom, Heather, Retama, etc.;

Fruit trees: Fig trees, almond trees, peach trees, quince trees, cherry trees, hazel trees, arbutus trees etc.

B. **Piles. Clones of existing trees or shrubs in the village;**

Willows, Mulberries, Elders (20/30cm long; Rosemary, Lavender, etc. (10/15cm of lenght).

C. **Seeds. Species present in Ferraria that reproduce best from seed**

Loureiros, Holly, Hawthorn, Aroeiras, etc.

Lunch Bags - March 26

Fresh bread for lunch - March 26

Snack at the end of the first day of work - March 26

SECOND PRELIMINARY MEETING FOR BOOTCAMP

FEBRUARY 25 TO 27

GOALS:

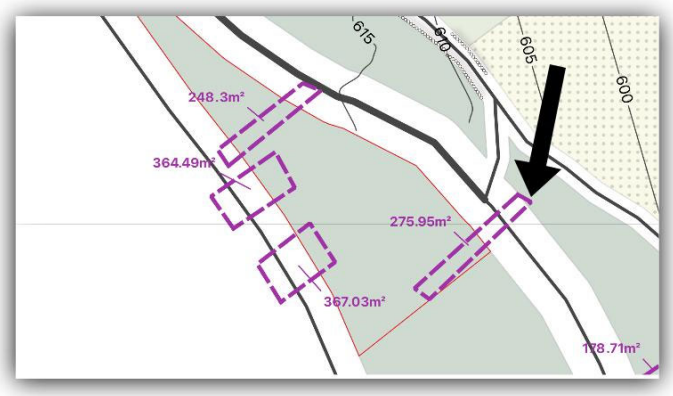
- Test planting method in the VPZ
- Try available tools and evaluate their functionality
- Preparing the eucalyptus for intervention
- Adjust the last list of needed resources

- TC arrived at the same time as the shredder for the creation of forest biomass, but didn't had the opportunity to verify its functionality.
- TC used the motor drill to make holes and found that it was difficult to make entire holes. For this reason it was necessary to finish the holes with an iron bar and a digger until reach the desired depth (25/30cm).

TC demonstrated how to build a nest from scratch and to build a nest around existing trees.

TC also intervened in an ARFSJ eucalyptus area, accompanied by a group of scouts and mentors, in order to demonstrate how to prepare it for transition:

- Outline the polygon with tape
- Identify the sprouts of another species
- Section and organize material for shredding
- Create stone micro-retentions for renewal
- Uncover the flowering acacias



Intervention polygon in eucalyptus

LATEST PREPARATIONS FOR BOOTCAMP

Reduction of the Intervention Area

As time passes and the event approaches, the difficulty in:

1. Produce or acquire the volumes of biomass and manure/compost necessary for implementation in all zones (AMFSJ polygons in zones 2a, 4d and 5a)
2. "Motivate" enough volunteers to carry out the implementation

It led to exclude zones 4 and 5 from the intervention and to focus available resources on zone 2a. Thus, the needs have been reduced to:

- 21m³ of wood chips/biomass
- ~4m³ of compost.
- ~25 volunteers
- 558 trees
- ~1116 stakes

Difficulties with the Plant List

1. Acquire or find out where to purchase the list of plants
2. Further develop the plant list by adding several fruit varieties to introduce into the system

BOOTCAMP MARCH 2022

MARCH 25 TO 27

Day 1 March 25th

When TC arrived it was verified that:

- ~1000 stakes were prepared in the water, entwined in sets of irregular quantity
- There were several cuttings in alveoli in the nursery to root and use in autumn
- There were ~550 bare-rooted fruit trees in the nursery
- The polygons were almost entirely marked with plastic tape.
- More than 80% of the planting lines were marked and it was not possible to finish due to lack of material.
- The distances between planting lines varied between 1.5m and 3m.
- No holes had been done in the lines.
- The compost/manure (approximately 2m³) and a part of the chip/biomass (a total of 11m³) were positioned "inside" the working polygon.
- The tools were organized, ready to use, almost all placed in the same place.
- 2 iron bars had been purchased as suggested.
- There was only one digger

In view of this situation, TC considered that several conditions for the implementation were not met.

- The number of fruit trees was higher than the 10% ideas in the initial implementation phase
- Support plants were not available
- We would have to start digging holes immediately so as not to delay the work.
- The intervention polygons needed cleaning with a brush cutter before opening the pits
- Compost and manure would have to be removed out of the polygon so as not to delay operations.

Some scenarios were considered:

- Return 80-90% of the trees in exchange for support plants if available at the nursery
- Plant one fruit tree per nest
- Suspend activities and postpone to another time after the situation has been corrected

After consideration and after realizing that it was not possible to return the fruit trees, it was decided to go ahead with the second option and still carry out the implementation with one fruit tree per nest. This would imply that half of the fruit trees would have to survive in a nursery or planted straight away.

Days 2 and 3 - March 26th

On the first day the Association tractor ran out of fuel and was inactive for the rest of the weekend.

TC started distributing the trees through the open pits and subsequent plantings as soon as possible until the volunteers arrived. At the time of their arrival, TC made a debrief on 1) the history of the VPZ; 2) the principles behind the interventions that would take place; 3) the nest planting system/method, and 4) the different teams to distribute work.

The planting work went well.

The distribution of resources was more difficult. The positioning of resources (e.g. compost and biomass within the polygon) ended up delaying the opening of pits and resulting in greater energy spent on distribution to the second polygon of the VPZ. A tractor from a resident was used to solve the situation and distribute chips and compost to the second polygon.

The reduction of the available composite and the commitment to the implementation in the two polygons led to an uneven distribution.

ARFSJ provided mid-morning snacks in individual bags and a well-packaged lunch in a pleasant environment.

Several technical exchanges lasting 20 to 45 minutes were planned on various topics such as: Natural Succession, Future of Forest Systems, Benefits of the Techniques Used, etc.

Before finishing the day's work, red tape was applied to the trees to identify them and create noise and movement at night to discourage deers and other animals.

With the end of the first day:

1. ~70% of pits complete
2. ~50% of trees planted
3. ~50% of trees had compost/manure
4. ~50% of the trees had Biomass coverage
5. 0% of the stakes
6. 0% of seeds

On the second day of Bootcamp we mainly focused on:

1. finish the pits
2. finish the plantations
3. start sowing
4. place the stakes
5. use the rest of the biomass
6. prune trees of unnecessary branches
7. remove excess buds, leaving 3 to 4 buds at the top of the tree.
8. remove flowers
9. Count and document

The day was windier and colder and created some discomfort. We had children involved in the efforts. Some of the volunteers from the day before were unable to attend.

Work was completed by 6pm.

- ~100% of the graves were planted
- ~100% of the plants were in Forest Biomass nests
- ~90% of plants had received compost/manure
- ~100% of the nests carried different seeds
- ~100% of the nests received a first watering (there was a group that decided to irrigate using a pick-up truck with a thousand-liter tank)

There was a brief assessment and discussion about the importance of sealing the land, taking into account the conditions in which was decided to go ahead with the plantation, which is now mostly made up of fruit trees.