



Systems and Repairs Manual

2024

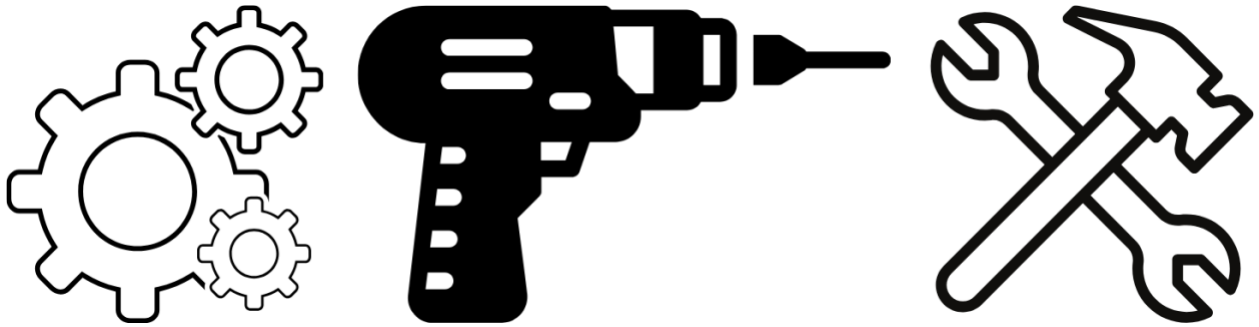
*This manual is made possible with support
from the USDA Beginning Farmer and
Rancher Development Program*



SYSTEMS AND REPAIRS

INTRODUCTION & SAFETY.....	4
FENCING	5
PALLET	5
ELECTRICAL	10
BARBED WIRE	
IRRIGATION	
DRIP IRRIGATION	
Fixing White Pipe	
Fixing T-Tape	

SYSTEMS AND REPAIRS



Introduction:

Community Through Colors operates La Finca de Hamberto, a small-scale USDA-certified organic farm in Vieques, Puerto Rico, and educational project AVES (Apoyo en Vieques para la Educación y la Sostentabilidad).

The purpose of this guide is to provide useful information and processes for farm systems and repairs we have developed at La Finca de Hamberto. This guide is intended to help the following farming populations: farmers in the Caribbean region; historically underrepresented/underserved farmers; socially disadvantaged farmers; and limited-resource farmers. ***NOTE: This document provides information on operations at Community Color's La Finca de Hamberto Farm and is not applicable to all farms or farming operations. Please feel free to use or adapt the information in this manual to best suit your needs.***

Safety:

Before starting a task or operating machinery, please be aware that without proper attire or preparation you may sustain injuries. We recommend the following at all times:

- Closed shoes (Work boots, Hiking boots, or Rubber boots)
- Protective clothing (Long pants, High socks, Long sleeve shirts etc.)
- Sun protection (Hats, Long sleeves, Sunscreen)
- Gloves while working with spiny/thorny vegetation or fencing materials

Note: This is just a recommendation, as we understand a preference for comfort, but you must be aware of the risks in not wearing protective attire during certain tasks. Please understand you may be denied from participating in a task due to improper attire. Our first priority is to avoid accidents and injury.

The following section outlines protocols and troubleshooting methods for checking, repairing, or rebuilding systems throughout the farm. Systems should be regularly monitored and maintained to ensure proper functioning of equipment. This is a living document and will be updated as needed to reflect the most current processes at La Finca de Hamberto.

FENCING

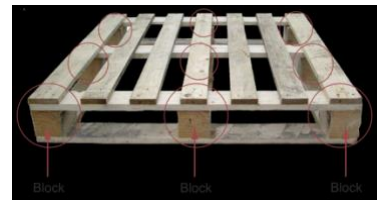
A perimeter check should be performed at least once a week or after large storms to identify and fix any broken, damaged, or weakened fencing. There are three types of fences at Finca Hamberto: pallet wood, electrical wire, and barbed wire. Pallet wood is an abundant and economically feasible resource, however, wood stored outdoors is prone to rotting, warping, or termite damage. Electrical fencing is expensive, and requires routine maintenance to run off of electricity generated through solar. Barbed wire is expensive, and requires occasional tightening of the sections. Repair and build instructions are outlined below for each type of fencing.

PALLET

Most common issues with pallet fencing include pallets that are starting to lean, wood which is rotting and panels missing, or termite damage which weakens the structure of the pallet. Remove damaged pallets and fix the fence according to the protocol below

Pallet Choice

1. If you are constructing an animal pen to actively retain animals (pigs, horses, other large animals, or baby animals), use the “blue pallets”
 - a. Blue pallets are considered to be those with nine blocks at all connecting points on the pallet
 - b. Blocks should be solid wood rather than plywood or aggregate wood splinters (these will expand with humidity or rain)
 - c. If you have small animals, use a pallet with bottom slats that are very close to or touching each other to prevent escapes
2. If you are constructing an animal pen to discourage animal movement (goats, sheep, ducks, and small animals), use the “white pallets”
 - a. White pallets are considered to be those with three stringers along the length
 - b. If you have small animals, use a pallet with bottom slats that are very close to or touching each other to prevent escapes
 - c. White pallets are considered to be those with three stringers along the length
 - d. Face the pallet slats inwards to prevent animals from kicking slats out
3. If you are constructing garden protection, either “blue pallets” or “white pallets” work



- a. If you have small animals, use a pallet with bottom slats that are very close to or touching each other to prevent escapes
- a. Face the pallet slats outwards to prevent horses from kicking slats in
- 4. General concerns during pallet selection
 - a. Pallets should not be repaired-repaired pallets are indicative of weak wood throughout the rest of the pallet
 - b. Pallets should be straight and not warped
 - c. Pallets should not wobble when placed along the end and twisted-wobbly pallets are indicative of structural weaknesses
 - d. Pallets should not show signs of termite or water damage

Construction

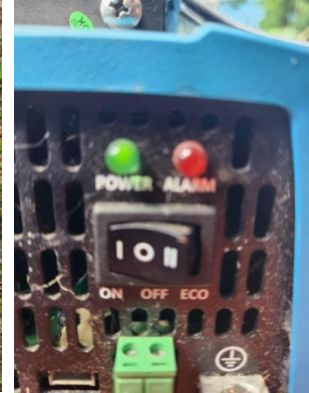
1. Lay a string along the desired fence path to ensure a straight line
 - a. If the ground is not flat or if extra sturdiness is required, a trench should be dug along the desired path
2. Align the pallets and decide where to place the gate, if needed
3. Attach pallets to each other, leaving the gate for last
 - a. White pallets should be placed end to end in a two pallet-cross pallet-two pallet pattern while blue pallets should be placed end to end in a two pallet-white cross pallet-two pallet pattern
 - i. For white pallets, screw two or three screws equidistant along the height of the pallet to connect pallets together
 1. For extra sturdiness, alternate direction of screw
 - ii. For blue pallets, screw pallets together at an angle through the blocks if possible; reinforcement slats are also highly recommended between each blue pallet at the top and bottom
 - b. Cross pallets should be attached at the center through multiple pieces of wood for maximum strength
 - i. Modifications may be necessary if the ground is slanted, if the fence line is moving backward, or if space requirements prevent a half pallet protrusion

Reinforcement

1. It is highly recommended to reinforce blue pallets at one or two points (top or top and bottom)
 - a. Place a half slat across both pallet blocks and attach to both pallets
2. If the pallets are leaning or additional strength is required, such as building a fence on or near a slope, use a white pallet to prop the section of fence along a seam and attach to two adjacent pallets
3. If the corner appears structurally weak, add a third pallet to create a triangle in the corner

ELECTRICAL

1. First, turn the electric fence off by flipping the switch from “on” to “off” at the blue control box. When the fence turns off, the audible clicking should stop
 - a. Make sure that if there is water on the cover of the control boxes, the water does not spill onto the controls when you are removing the cover
 - b. If the electric fence is already off, troubleshoot the solar panels
 - i. Are the panels covered in weeds or blocked by a bush or tree from receiving sunlight? If so, carefully clear the panel of brush or blockage
 - ii. Is the panel plugged into the battery to charge?
 - iii. Was there a period of cloudy weather which may delay the charge?
2. If a post is broken, remove the post and stake a new one
3. If the string is broken, cut a new section of string and tie the ropes together, making sure the ropes are thoroughly in contact to ensure transmission of electricity
4. If the string is touching metal, is in close proximity to a tree, or is touching another grounding source, move the wire or wrap in electrical tape to prevent electricity drain



5. Check the ground rod to ensure it is properly connected and free of oxidation
6. Check the connection between the energizer and the wires. Is everything plugged in?

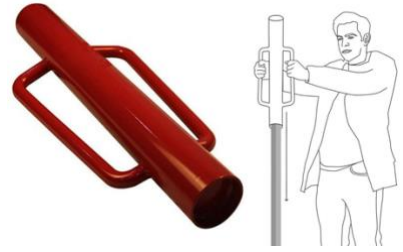


7. Once the fence is fixed, turn the fence back on
 - a. Check the fence with the tester. If issues persist, return to step 1
 - i. Stick the metal probe into the ground
 - ii. Hook the metal hook around the fence wire
 - iii. Watch the gauge for flashing light



BARBED WIRE

1. If there is an issue with any posts supporting the barbed wire, remove the old post and dig a hole for a new post
 - a. If the break is in a large stretch of stakes without a tree, consider adding a metal post in the middle to add extra support. Insert metal post into the ground using the metal post pounder



2. If the barbed wire is loose, use the wire tighteners to crimp the section until the wire is taught



IRRIGATION

Finca Hamberto uses a variety of irrigation techniques: drip irrigation, center pivot irrigation, flood irrigation, and mobile pivot irrigation. Irrigation systems should be inspected prior to every usage to ensure there are no leaks or runoff to minimize water loss.

DRIP IRRIGATION

Fixing White Pipe

First, make sure both ends of the pipe are dry and clean. Wipe off any excess dirt or debris before starting. Once the pipe is dry, smear PVC cement around the exterior of the inner pipe and immediately insert into the outer pipe. Work quickly, since the cement dries fast and cannot easily be removed. Monitor this section for leaks the next time the system is used.



Fixing T-Tape

First, determine the extent of the puncture or tear. Make a clean cut around either side, cutting out the damaged section. Then, take a connector and attach to either end of the remaining t-tape. Monitor this section for leaks the next time the system is used.



To extend the system, first use the above guide on how to repair white pipe to extend the piping to the desired location or length. Next, make a cut along the length where the T-tape will branch. At full pressure, the t-tape is designed to cover a 12" diameter. Screw a nozzle into a white branching pipe, securing with thread sealing plumbers tape, and connect the white branching pipe to either end of the cut using PVC cement and ensuring the nozzle is not pointed upward. Secure t-tape to the nozzle and monitor this section for leaks the next time the system is used.



Pallet Panel

The pallet panel can be used to construct tabletops, roofs, ramps, shade, and more. A basic method of reinforcement is strong enough to bear significant weight, and can be modified to a more rigorous design which maximizes weight dispersion by replicating the center support twice in parallel and attaching to the edges. Per panel, prepare:

- 3 structurally sound stringer pallets
- Pallet slat pry bar (or other method of removing pallet slats)
- Table saw
- Hammer/pry bar (for nail removal)
- Sixteen 2.5” nails and drill driver



1. Lay first pallet face down such that the side with fewer slats (connecting slats) is accessible
-the surface with evenly distributed continuous slats will be the surface and should be left intact



2. Use the pallet slat pry bar to remove all connecting slats from the accessible surface only
-save these slats for later use

3. Repeat steps 1-2 for the second pallet



4. Fully deconstruct a third pallet
-save both the slats (left) and the middle support beams (right)
for later use



5. Use the table saw to cut 6 reinforcement planks
-size 13.5" long (any height) with 45° angles



6. Align the two partially deconstructed pallets by matching
short ends together



7. Center a middle support beam across the seam of the two
pallets
-this is used as a reference for step 8 and 9



8. Align the end of the support beam to the edge of the first reinforcement plank
-ensure the bottom of the connecting plank is flush to the pallets

9. Secure the plank to the pallet with a screw



9. Repeat on the opposite side to form a triangle with a second connecting plank



10. continue securing the connecting planks to the pallet until all six planks are attached
**note: the connecting planks should alternate directions every plank



11. Wedge the center support piece between the six connecting planks and securely attach to each plank



12. Attach a small piece of wood (size not specified, may be scrap wood) across both pallets on each of the two outer edges to stabilize
**note: If a more rigorous build is desired, repeat triangular support design on the outer edges in place of the small stabilizing sections