

# Rural Food Processing

## Assembly /Operational Manual

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## Introduction

This document provides information on how to operate the roller and dispenser. Section two of the document will cover the manufacturing and assembly installation. The team also included an appendix section that will go over the detailed drawings of the both the roller and the dispenser devices.

## Operation

This section will go over the detailed steps needed to operate the device.

### Operation steps



*Figure 1: Dispenser*

1. Prepare for rolling
  - a. Food safety recommendations include:
    - Wash your hands with warm hot soapy water for 20 seconds [1]
    - Wash counter and cooking tools with hot water [1]
    - Keep raw cocoyam and cooked cocoyam separated [1]
    - Use different tools for raw and cooked cocoyam [1]
    - Cover your mouth with a mask and your hair with a hair net
2. Cover base of roller under silicon with palm oil
3. Put the raw cocoyam inside the dispenser tube (Figure1)
4. Prepare cocoyam leaves to desired size for cooking
5. Dispense the raw cocoyam onto the prepared leaves by pulling back the handle on dispenser consistently until desired amount has been dispensed

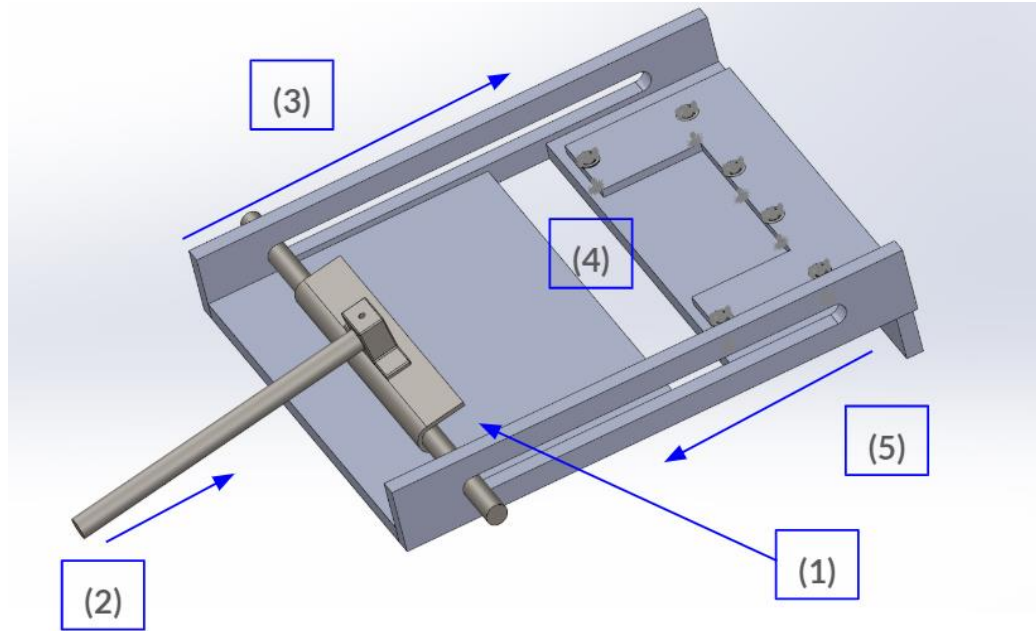


Figure 2: Isometric view of roller with numbered indicators.

6. Place the cocoyam leaf with dispensed cocoyam on top of the silicone close to the handle. This area is labeled (1) in Figure 2
7. Push the handle forward in the direction of arrow (3) in Figure 2 until the cocoyam roll falls into the cavity labeled (4) in Figure 2
8. Proceed by moving the handle backward in the direction of arrow (5) in Figure 2
9. Remove the rolled cocoyam from the roller
10. Repeat this process until the desired number of rolls are made
  - a. Refilling the dispenser may be required depending on desired number of rolls
11. Clean the device with soapy warm water after completed use of the roller and dispenser
12. Keep the device stored in a clean place away from the reach of children

## Manufacturing/Assembly

This section will detail manufacturing and device assembly.

### Manufacturing/ Assembly steps

1. Cut out roller base top, roller base bottom, side rails, belt end bracket, and base stand. Refer to separate CAD drawing document for exact dimensions.
  - a. Roller base top, roller base bottom, side rails, and base stand are made from  $\frac{1}{2}$ " thick wood
  - b. Belt end bracket made from  $\frac{1}{4}$ " thick wood
  - c. Holes and slots will be cut in a later step (cut only the outline of each part)



*Figure 3: Roller Parts*

2. Cut the  $\frac{5}{8}$ <sup>th</sup> inch dowel rod into two lengths: 16" for roller bar and 10" for handle (refer to drawing)
3. Using 3D printed filament, print out the top handle bracket and bottom handle bracket
  - a. These can also be made from metal instead by milling out the top handle bracket and bending the bottom handle bracket from sheet metal, or wood by milling out each bracket
  - b. Adhere the brackets together using a strong adhesive
4. Sand all edges and remove all burrs from all components

- Using the supplied drawings, mark out the location of the slot on both rails to match the drawings, using a pencil



*Figure 4: Marking out the slot location*

- Once the slot is drawn in pencil, use a 5/8<sup>th</sup> inch drill bit and drill two holes in the curved portion of the slot. Make sure to center the holes along the inside curve to the curve to stay within the pencil line.



*Figure 5: Drilling the two holes in a curved portion*

- Using a jig saw place the saw blade within the holes you just drilled and follow the pencil lines to cut out the slot



*Figure 6: following the pencil line with a jig saw*

- Sand the newly cut slots
- After you have completely cut out the slot you will test the fit of the dowel rod. Take the dowel rod cut in step two and place it in the slot. If the dowel rod does not fit use sandpaper or a file to expand the slot until the dowel rods fits and moves freely within the slot.
- Take the roller base top and place it vertically like Figure 7, with the rail on top of it



*Figure 7: placing the rail on top of the base top*

11. Staple the side rail to the roller base top



*Figure 8: Stapling the side rails*

12. Take the roller base bottom and place it vertically under the side rail as well. Using the other side rail, place it between the roller base top and bottom like figure. Now you can staple the side rail to the roller base bottom. Only two staples are needed for each the top and bottom base plates. Make sure to center them within the roller base for the most durability.



*Figure 9: placing the other rail on bottom of the base and stapling it together*



13. With correct spacing already measured on the rail you can simply place the unused rail on the other side of the roller base and staple it into place
14. Place the roller base stand underneath the front edge of the roller base top like Figure 10 and staple the pieces together using three staples



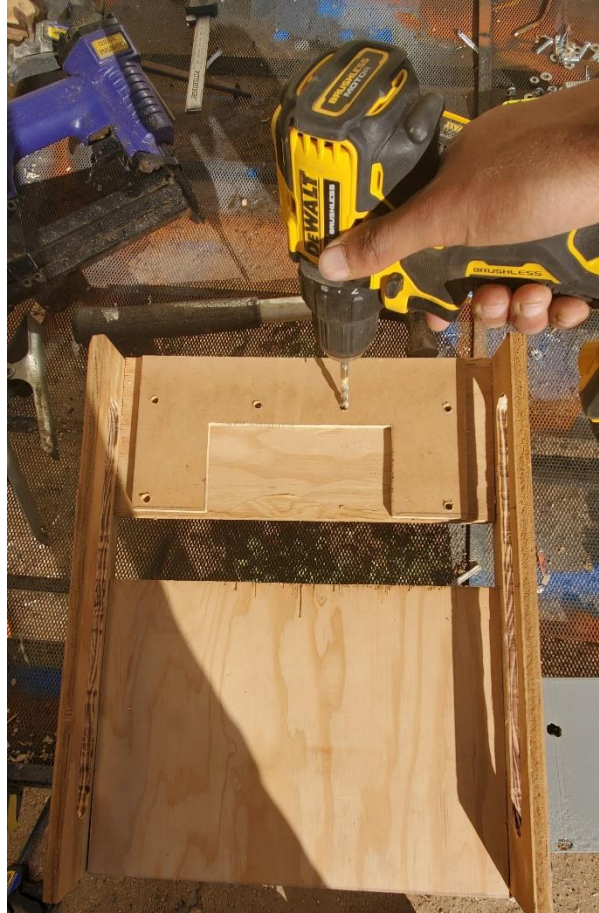
*Figure 10: Placing the roller underneath the front edge and stapling them together*

15. Place the belt end bracket on a secure surface and mark out the six holes as seen in the drawings.
16. Using a drill, drill out the holes in the end bracket



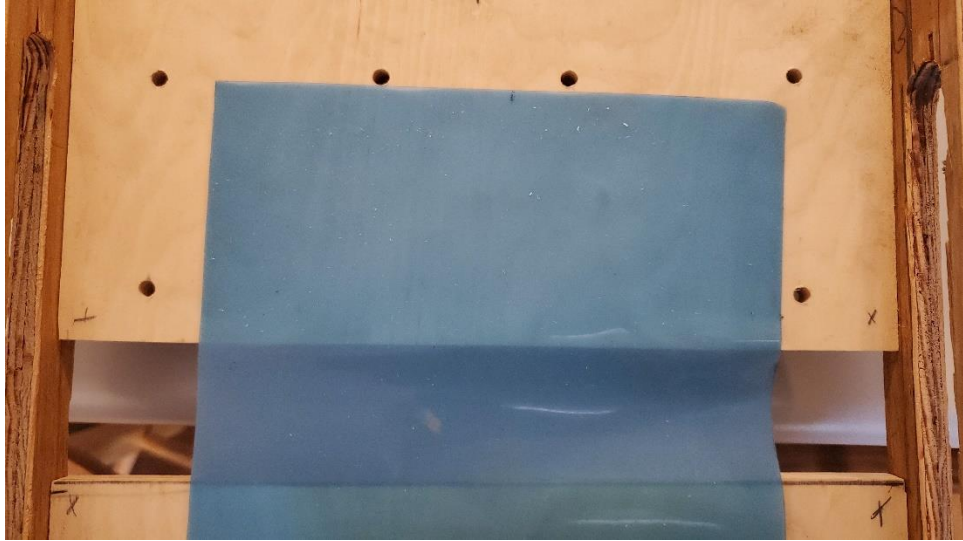
*Figure 11: Drilling out holes in the end bracket*

17. With the holes drill aligned the longest edge of the bracket with the top of the base top and clamp or hold it in place
18. Using the holes in the end bracket drill through those holes and into the roller top so they both matches.



*Figure 12: Drilling holes through the end bracket and into the roller*

19. Place the 5/8<sup>th</sup> inch dowel rod (roller bar) into the slot and move it to the point furthest away from the roller base stand
20. Place the supplied silicon sheet on the base laying it across both the roller top and bottom pieces. Place it slightly lower than the holes in the top



*Figure 13: Placing silicon sheet*

21. Put the belt end bracket on top of the sheet aligning the holes in the bracket and roller base top.
22. Place a bolt through each hole and fasten with a nut and washer



*Figure 14: Inserting bolts through bracket*

23. Take the end of the silicon sheet furthest away from the bracket and wrap it around the dowel rod only to till the sheet touches itself



*Figure 15: Wrapping silicon sheet around dowel rod*

24. Squeeze the handle onto the dowel rod and silicon sheet fixing the sheet into place



*Figure 16: Pushing handle onto dowel rod*

## Dispenser

1. If using caulking gun A, the caulking gun will come completely assembled except for the tip not being in place.
2. Before securing the tip, cut the closed end of the white tip using scissors or a knife to the desired diameter of the roll
3. You can now unscrew the end cap and place the tip in with the cut end pointed away from the device. Screw the end cap back on tightly.



Figure 17: Dispenser A

4. If using caulking gun B, you will need to cut the tip of the supplied tube to the desired diameter of the roll
5. Pull the silver handle back on the caulking gun and insert cut tub into the device.



Figure 18: Dispenser B

## Potential Troubleshooting

- If roller bar becomes dislodged from roller
  - Stop rolling motion
  - Remove roller bar from handle and silicon sheet
  - Reposition roller bar so it is centered between side rails
  - Reassemble handle and silicon sheet to roller bar
- If silicon sheet slips out from end bracket
  - Stop rolling motion
  - Return roller bar to start of roller
  - Remove bolts, washers, and nuts from the end bracket and lift end bracket up off roller base
  - Reposition silicon sheet centered to end bracket holes
  - Reassemble end bracket and fasteners
- If dispenser is no longer dispensing cocoyam
  - Stop operation of dispenser
  - Check dispenser to determine if all cocoyam has been dispensed
    - If dispenser is empty, simply refill and resume use
  - If dispenser is not empty, the tip is most likely clogged
  - Disassemble dispenser and remove tip
  - Wash tip with warm water to remove any debris
  - Reassemble dispenser and continue use
- If staples become loose or fall out of roller
  - Remove roller bar and handle from silicon sheet and roller base
  - Locate area where staple has fallen out or is loose
  - Place roller on a flat surface so the face where the staple is faces upward
  - Replace staple with a new staple around area where original staple was located
- If silicon sheet is not rolling properly
  - Stop rolling motion
  - Most likely cause of irregular rolling is damage to the silicon sheet or not enough palm oil on roller base
  - If silicon sheet is damaged
    - Remove roller bar and handle from silicon sheet
    - Disassemble end bracket and hardware from roller base
    - Remove damaged silicon sheet
    - Replace silicon sheet
    - Reassemble end bracket and hardware
    - Reassemble roller bar and handle
  - If silicon sheet is not damaged
    - Rub additional palm oil into roller base under silicon sheet

## References

- [1] O. of the Commissioner, "Food Safety at Home - Fact Sheet," *U.S. Food and Drug Administration*. [Online]. Available: <https://www.fda.gov/consumers/free-publications-women/food-safety-home>. [Accessed: 30-Apr-2020].