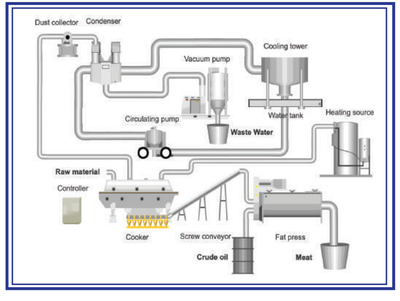
PROJECT

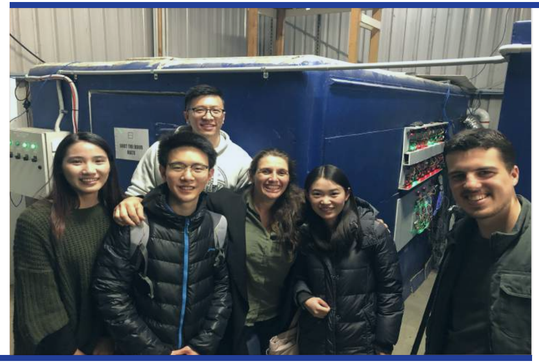
SCOPE MOTIVATION

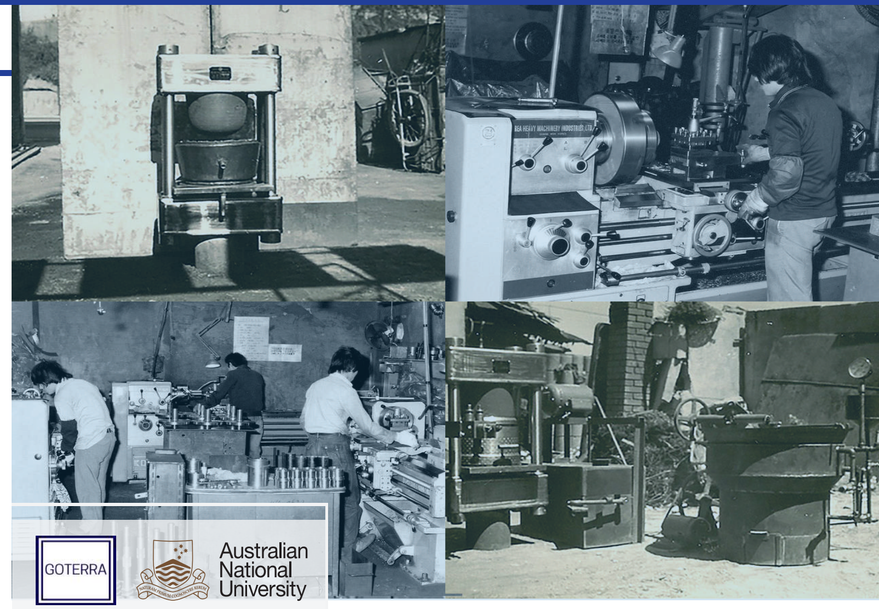
Every business produces waste, whether it be organic or industrial. With the world population ever increasing, along with its thirst for resources, Goterra seeks to transform common organic waste into high value protein and oils through the use of breeding Black Soldier Fly Larvae. By utilizing mobile insect breeding plants, transporting them to areas where there is high organic waste output, Goterra allows on site production of larvae, eliminating the need for material transportation or infrastructure. The project our team has been tasked is to conduct feasibility analysis and design of a mobile insect rendering plant that contained in one (or more) containers can accompany the mobile farming plant from site to site.

SYSTEM INTRODUCTION

1. Insects move into Continuous Cooker
2. Cooked for 2 hours, then dried for 3, vapour is extracted into Dust Collector, and meal into Fat Press (through screw conveyer)
3. Fat Press separates Meal from liquid tallow, both of which is then ejected into outside storage
4. Dust Collector removes any solids from the vapour, which is then condensed in the Condenser.
5. Waste water pumped outside, stored before treated further.
6. Cooling tower and Water tanks used in the Condensing process





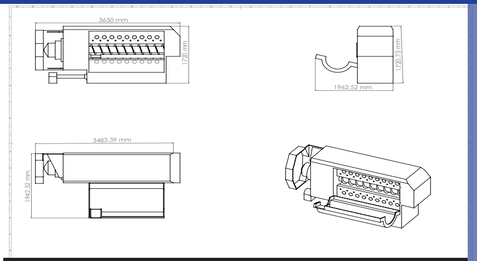


GOTERRA

Australian National University

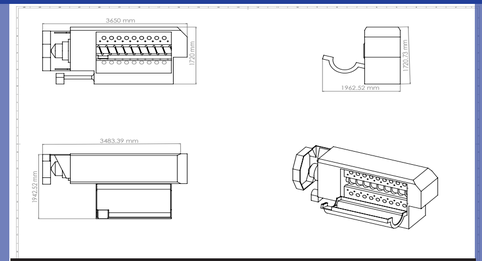
Andre Olivier Derek Tan Jiaying Ying Minghui Zhang

MOBILE RENDERING PLANT DESIGN



Fat Press

Once the material has been cooked and dried, it is moved through the conveyer into the fat press, where through a rotational device (as shown to the left) forces the solids from the liquid tallow, and then ejecting the two quantities separately.

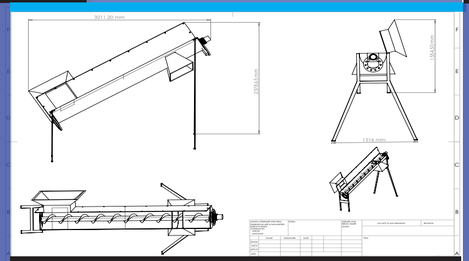


Condenser

Used to cool the removed vapor from the cooker into waste water that is removed at the end, and stored for further processing.

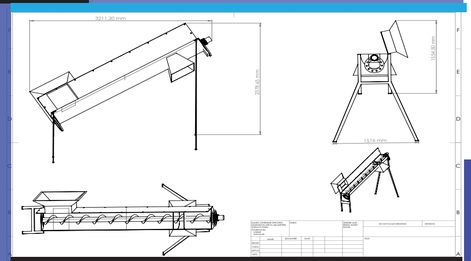
Screw Covenyor

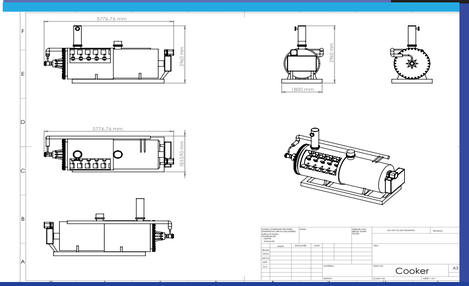
Meant for transporting the cooked material from the cooker to Fat Press.



Dust Collector

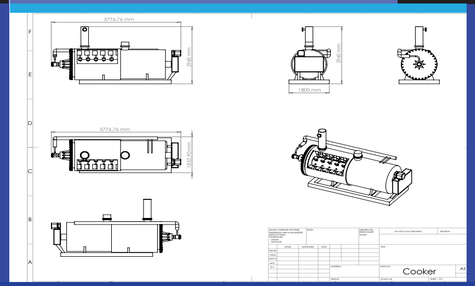
Removes solid particles from the vapor, as well as other impurities.





Batch Cooker

The term "batch cooker" refers to the process by which the cooker processes the material. Cooked in batches, for a period to releases all water contained in the larvae, and then dried for another period to remove it, the material is the n transported out of it, dehydrated and ready to be further processed.



Cooling Tower

Cools water used by the condenser in the condensing process (not the waste water that condenses from the vapor from the cooker)

Impact

Addresses Barrier to Market

Low Capital Expenditure enables players to enter market

Generates High Value Products

Widely usable protein meal and oils from low value waste

Environmentally Sustainable

Significantly more efficient than current agricultural practices

Popularizes Insect Protein as a Food Source

Helping increase production, insect protein becomes normalized

The Future

1. **Expanding Rendering into Other Animal Materials**

While currently able to process insects only, future projects will seek to expand the designs capability to process animal offal and fish.

2. **Redesigning Process Equipment**

Currently most of the equipment sourced for the design is over capacity. As this project is continued, specific equipment can be design ed to be smaller and more efficient for Goterra.

3. **Increasing Synergy between Farming and Rendering Modules**

Can waste heat from rendering be used in the farming module? Is the waste water extracted of any value in the rest of the process? These questions and others will be sough to be answered.