



This is Behind the Leaf Coffee team member Nan Saung. It's the beginning of rainy season, finished making all of the bedding and getting some of our first harvests of vegetables. The picture is taken by Preston Kunz @prestonkunz



# COFFEE INNOVATION

## Behind-the-Leaf Bunk Beds

Dual-Use Drying Beds Enhance Coffee Quality and Revenue Off-Season

# OVERVIEW: BEHIND THE LEAF BUNK BEDS



## CHALLENGE

Coffee drying takes up a lot of space, and compacts soil so as to make it unsuitable for other uses in the off season. Coffee waste is generated by coffee processing is also usually not used optimally. Labor is difficult to find during coffee harvest because of seasonality and labor migration for better pay.

## INNOVATION

### QUALITY & CONSISTENCY

This "bunk bed" allows for high quality coffee processing, year-round employment opportunities for staff, and composted coffee waste provides nutrition to vegetable beds.



## COMPANY DESCRIPTION

Lilypad Co., Ltd., established in 2006 in Pa-O villages, Pin Laung township, provides business solutions to benefit the community. Lilypad is developing low-cost, replicable technologies in areas of water, agriculture and construction.

### NUMBER OF STAFF

21 FULL-TIME STAFF



## COSTS BENEFIT ANALYSIS

### COSTS

EUR 130 FOR ONE COMPLETE  
"BUNK BED" SET

### EFFECTS ON REVENUE

COFFEE PRICES STABLE

### EFFECTS ON YIELD

TO BE DETERMINED



## PREPARATION

### TIMELINE

ONE MASON CAN BUILD ONE BOTTOM BUNK IN  
ONE DAY AND ONE WELDER CAN BUILD TWO TOP  
BUNKS IN ONE DAY



### STAFFING REQUIREMENTS

ONE WOMAN CAN MANAGE 10 BUNK BEDS  
EXPERTS: MASON, WELDER, COFFEE PROCESSING  
SPECIALIST, AND NATURAL FARMING CONSULTANT

### MATERIALS & EQUIPMENT

- RECTANGULAR METAL TUBING
- WIRE SCREEN 48X180X2IN
- WELDING ARC
- MESH BED SHEETS
- RAINPROOF COVERING
- CEMENT AND CINDERBLOCK
- BED POSTS (6 PER BED)
- INTERLOCKING COMPRESSED EARTH BLOCKS



## LESSONS LEARNED

### CHALLENGES

Sufficient space for the drying beds  
Sufficient water for coffee processing  
Lost buyers from COVID-19

### TAKEAWAYS

After observing the tables in use and with quantified results from the production available in the bottom bunks people will be more ready to adopt them. We will also accompany that with training on how to produce crops like ginger and mushrooms in the bottom bunk. Spending time to make the soil for the bedding was a lot of time and labor but good investment.

# RESULTS

As a result of Behind the Leaf's trial,



This picture is of a few BTL "Bunk Beds". One person is saving salad seed from the garden bed and the other three are drying coffee on the top bunk. The picture is taken by Atalie Bale @ataliebalephotography



1,028

FARMERS AND 32 HA OF LAND  
IMPACTED, 152 NEW FARMERS  
TRAINED



3,800

COFFEE SEEDLINGS  
DISTRIBUTED; 25 BEDS USED  
AS "BUNK BED" NURSERY



32

HECTARES OF LAND



152

NEW FARMERS TRAINED

Quality increased, volume of quality  
processed increased. BTL anticipates a  
reduced running cost



# IMPLEMENTATION



Mason building the base of a bunk bed unit, using compressed earth blocks.

1

## DECIDE SIZE OF BEDS

Decide on the size that you want for the beds and the drying area. The BTL "bunk beds are 4 feet wide and by 15 feet long. Size can vary depending on preference and space available. It's also important to keep in mind dimensions of the local materials you will use so you can limit waste when cutting.

2

## DIG & POUR FOOTER

Dig and pour a concrete footer that outlines the footprint of the bed. The footer should be slightly longer and slightly wider than the final outside dimensions of the finished table. The footer should be poured so that it produces a level surface to make the blocks easier to lay.

3

## BUILD THE BASE

From the footer you begin laying runs of block to make the bottom bunk. We used Interlocking Compressed Earth Blocks for our tables. Continue up with layers of block enclosing the bottom bunk to a depth of to approximately two feet. Just ensure that at the shallowest part of the bottom bunk there is at least 1 foot of depth. If the soil is too shallow in places it will inhibit the ability for plants to grow well in the bottom bunk.

4

## CREATE THE LEGS

After the bottom bunk is at an appropriate depth, at each corner and in the middle of the long lengths continue up with a column of blocks. These short columns will create legs for the drying tables. The legs should be approximately 1 foot high, enough space to create a good airflow underneath and be an appropriate level for workers to reach and turn the cherries.

## IMPLEMENTATION



"Top bunk" drying tables can be removed and stacked outside of coffee harvest season so that the "lower bunk" beds can be used for vegetables, coffee seedling nursery etc.

5

### FILL THE BED

Soil, compost, and manures can be added to the enclosed area of the bottom bunk. The garden bed material depends on what you have available (coffee waste, soil, compost) and what you want to grow. Coffee nursery bed material is different from bedding used for growing vegetables.

6

### CREATE THE TOP BUNK FOR COFFEE DRYING

The top bunk is a porous metal table that rests on the six legs of the bottom bunk. We created a frame from metal hollow tubing and then applied 1 inch screen mesh to the frame. Attention should be given to use materials and sizes sufficient to create a rigid frame. The frame should not bend and deflect when loaded with wet coffee. Under load it will create low places on the table where the coffee will be deeper and will not dry as well. A rigid surface for the table allows the processor to create a uniform layer of coffee that will dry more uniformly.

7

### COVER MESH TABLE WITH SHADE CLOTH

Over this metal frame a layer of shade cloth or agricultural cloth is applied.

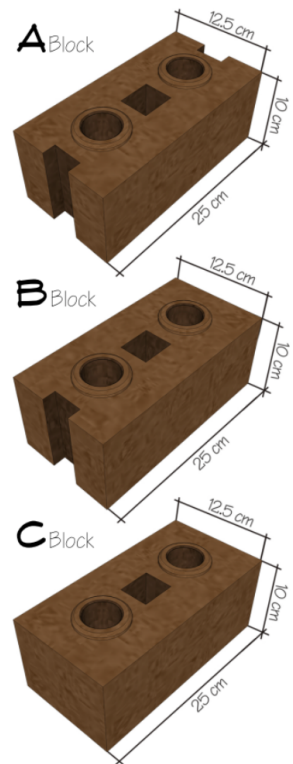
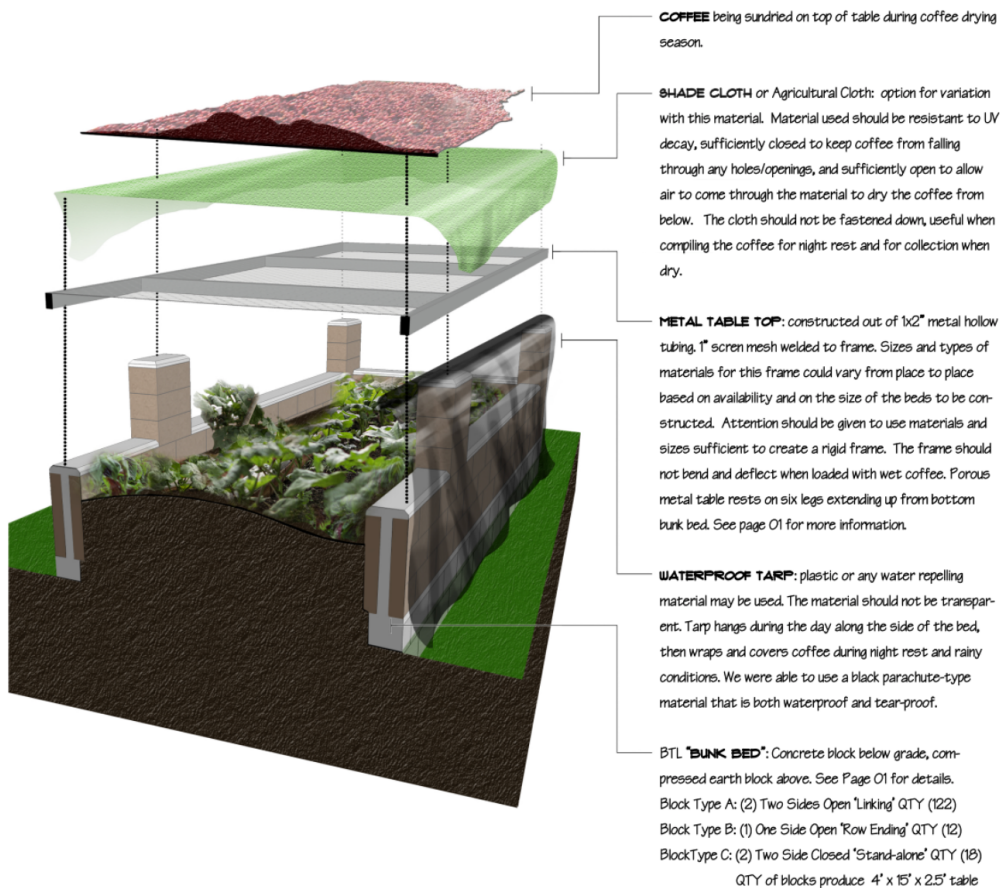
Again, there is opportunity for variation with this material. Whatever material is used it should be resistant to UV decay, sufficiently closed to keep coffee from falling through any holes/openings, and sufficiently open to allow air to come through the material to dry the coffee from the below. The mesh should not be fastened down because it is useful when compiling the coffee for night rest and for collection when dry.

8

### INSTALL RAIN TARP

The final piece for the top bunk is a tarp that will cover the coffee at night and during rainy conditions to prevent rewetting of drying coffee. Plastic or any water repelling material can be used. The material should not be transparent. We were able to buy a black parachute-type material that is both waterproof and tear-proof.

## ANNEX



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**For further information:**

Lilypad Co., Ltd. (Behind the Leaf Coffee)

Melanie Edwards

[behindtheleafcoffee@gmail.com](mailto:behindtheleafcoffee@gmail.com)

[www.behindtheleafcoffee.com](http://www.behindtheleafcoffee.com)



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Registered offices

Bonn and Eschborn

Dag-Hammarskjöld-Weg 1-5

65760 Eschborn

T +49 61 96 79-0

F +49 61 96 79-11 15

E [info@giz.de](mailto:info@giz.de)

I [www.giz.de](http://www.giz.de)

E [info@giz.de](mailto:info@giz.de)

I [www.giz.de](http://www.giz.de)

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Behind the Leaf and Jen Green, Jakarta

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Vanna Sann, Phnom Penh

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**MISSION**

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