

## Stabilised Soil Brick (SSB) making

**START UP COSTS: \$2,000-\$3,000**

**PROFITABILITY: Net Profit \$1,250 p/month (excluding labour) based on production of 10,000 bricks p/month**

**NEEDED: Start-up capital for investment, sub-soil on site, strong labour**

**BARRIERS: Need access to brick press seller and training**

### Introduction

Brick making remains an important industry in many rural and peri-urban areas, but the income it provides can be a very marginal one. Often there are large numbers of producers and the quality of bricks produced can vary greatly. Stabilised Soil Brick technology (also known as Stabilized Compressed Earth Block (SCEB)) allows producers to easily manufacture higher quality bricks and as a result receive a higher income for themselves.

### What are Stabilised Soil Bricks?

Stabilised soil bricks technology offers a cost effective, environmentally sound masonry system. The product has a wide application in construction and is manufactured by compacting earth (murrum/sub-soil) mixed with a stabilizer such as cement or lime. A number of manual machines are available which compact the soil to attain dense, even sized masonry. The bricks are then laid out in the sun and cured rather than being fired. Some SSB technology also includes an interlock (called ISSB) resulting in lower mortar costs. The bricks have four key advantages over traditional bricks:



The Progression of SSB Technology

### Advantages:

#### 1) Build Quality

SSB allows users to produce uniform blocks of greater strength than typical fired blocks that provide better thermal insulation.

#### 2) Financial:

The total cost of building a structure with SSB is 20%-30% cheaper than building with fired bricks because far less mortar is required, structures don't have to be plastered, and bricks can be made on site so transportation costs are minimized.

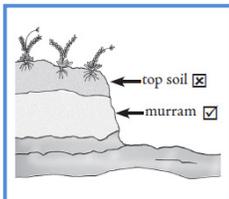
#### 3) Environmental:

Because SSBs are cured in the sun, the need for fuel wood is eliminated, helping curb deforestation rates.

#### 4) Appearance:

The bricks have an appealing aesthetic with an elegant profile and uniform size that doesn't require plastering.

### How are the bricks made? The Process:



#### Soil Selection

#### 1) Soil selection

A site evaluation has to be carried out to make sure you have suitable soil for brick making. A number of cheap and easy tests have been created to effectively test soil quality. You are looking for sub-soil with few stones of a fine quality.

#### 2) Stabilisation & Mix Preparation

First the soil must be sieved to remove foreign elements from the soil. Then the soil must be mixed with a stabiliser to maximise strength – usually cement, but lime can also be used. The stabiliser must be thoroughly mixed with the soil and then water added.

#### 3) Compaction

The soil mixture then needs to be compacted to ensure strength and quality. Generally a manual hand press is used. The bricks need to be carefully removed from the mould and stacked correctly.

#### 4) Curing

The bricks are then left in the sun to cure (no firewood needed!) and water is sprinkled to aid curing. The bricks must then be stored correctly, often under sheeting, awaiting transportation.

### 5) Selling

28 days after manufacture, the bricks are ready to sell. Whilst new technology can be slow to catch on, when the benefits of SSBs have been made apparent sales will follow. SSB can also be used for any on-site construction to lower your own costs.

#### What's required to start the business?

- A **brick press** will be required for compaction, and must be sourced. If not, making your own machine is a possibility, but would require real expertise.
- A site evaluation then has to be held to ensure enough **sub-soil** is available to make large quantities of bricks. Importing soil is expensive and so availability of sub-soil is a priority.
- **Knowledge** those involved must understand how you produce SSBs. They can either be trained by an experienced SSB maker, or learn through a number of guides found online (see Teach a Man to Fish website for info). Having a trainer is recommended.
- **Other tools** needed may already be available, if not, they too need to be purchased.
- Capital also has to be found to purchase the required **cement**, and a cash flow analysis started to make sure the producers know when bricks have to be sold.



Students in Uganda making SSB

#### Costing:

The figures below are a rough estimate of the costs of making your first batch of 15,000 SSB bricks. Figures are in US dollars and estimates, but demonstrate how profit can be derived from the manufacture of 15,000 (capably produced in a month) even including start-up costs.

If sub-soil or labour needs to be paid for the price of the brick can be increased, as long as it remains competitive with locally produced fired bricks. Even factoring in labour costs, profitability can be achieved within 3-6 months.

#### Figures:

Start-up Costs			
Item	Unit Cost	Unit (s)	Total Cost
Start-up Costs:			
Brick Press	\$900	1	\$900
Transportation	\$1,000	1	\$1,000
Wheelbarrows	\$15	3	\$45
Spades/Hoes	\$5	5	\$25
Other Tools	\$30	1	\$30
Contingency Fund (10%)			\$200
<b>Total Start up Cost:</b>			<b>\$2,200</b>

#### Notes:

- 1) Profit based on producing 15,000 bricks, enough to make a 2-classroom block
- 2) A bag of cement is assumed to be 50kg and produce 120 bricks
- 3) Assumed sub-soil will be on-site and labour provided free by school/community
- 4) Plastic sheeting required to cover brick when its being pressed
- 5) All costs approximate and based on Uganda case-study, 2009
- 6) If labour isn't free, the press requires 2 men to work the press, and at first an additional man for soil collection & mixing. They can expect to make 480 to 600 bricks a day.

Monthly Production of 10,000 bricks			
Item	Unit Cost	Unit (s)	Total Cost
Operational Costs:			
Plastic Sheetting	\$1	65	\$65
Cement	\$10	84	\$840
Murram	Onsite	-	\$0
Labour	-	-	\$0
Maintenance	\$50	1	\$50
<b>Total Operational Cost:</b>			<b>\$955</b>
Depreciation			
Per month	\$50	1	\$50
<b>TOTAL COST</b>			<b>\$1,005</b>
Bricks made	\$0.25	10,000	\$2,500
<b>TOTAL REVENUE</b>			<b>\$2,500</b>
Profit per brick			\$0.15
<b>TOTAL PROFIT</b>			<b>\$1,495</b>

#### Manual Press Providers

##### International

**Aureka** – India-based, but ship internationally ([www.aureka.com/](http://www.aureka.com/))

**Hydraform** – Mechanised, International ([www.hydraform.com](http://www.hydraform.com))

**Lo Cost Housing** – Manual & Mechanised ([www.locosthousing.com](http://www.locosthousing.com))

##### East/Central Africa

**Kickstart** – Manual, East and Central Africa ([www.kickstart.org](http://www.kickstart.org))

**Comac** – Manual, East Africa ([www.comacLtd.com](http://www.comacLtd.com))

##### Latin America

**Tierra y Cal** – Mexico Based (<http://www.tierraycal.com/>)

**Pro tierra** – Colombia Based (<http://www.protierra.com.co/>)

#### Further information

SSB technology is already widespread in many parts of the world, and much information is available. Please look at the **Teach a Man to Fish** website or visit one of these websites:-

- **Practical Action** – Practical Guidebooks ([practicalaction.org](http://practicalaction.org))
- **Earth Auroville** – Great general information (<http://www.earth-auroville.com/>)