



## Natural building in modern world

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## What is natural building:

This tool involves a range of building systems and materials that place major emphasis on sustainability. Ways of achieving sustainability through natural building focus on durability and the use of minimally processed, plentiful or renewable resources, as well as those that, while recycled or salvaged, produce healthy living environments and maintain indoor air quality. Natural building tends to rely on human labor, more than technology.

The basis of natural building is the need to lessen the environmental impact of buildings and other supporting systems, without sacrificing comfort or health. To be more sustainable, natural building uses primarily abundantly available, renewable, reused or recycled materials. The use of rapidly renewable materials is increasingly a focus. In addition to relying on natural building materials, the emphasis on the architectural design is heightened. The orientation of a building, the utilization of local climate and site conditions, the emphasis on natural ventilation through design, fundamentally lessen operational costs and positively impact the environmental. Building compactly and minimizing the ecological footprint is common, as are on-site handling of energy acquisition, on-site water capture, alternate sewage treatment and water reuse.



## Mini Bio-Gas system

### Aims:

- to raise awareness on youth on the necessity to educate young people about the value of renewable resources and its impact on the environment
- to enable young people acquire new skills and techniques through practical and real experience

**Target group:** Youth interested in eco-building

**Number of people:** 1-2

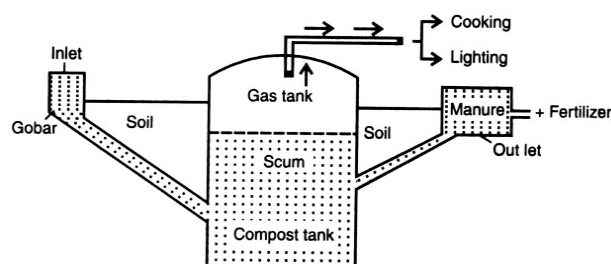
### Description:

The biogas produced from food waste, decomposable organic material and kitchen waste, consisting of methane and a little amount of carbon dioxide is an alternative fuel for cooking gas (LPG). Also, the waste materials can be disposed off efficiently without any odor or flies and the digested slurry from the biogas unit can be used as an organic manure in the garden.

### Components of the Biogas Plant

The major components of the biogas plant are a digester tank, an inlet for feeding the kitchen waste, gas holder tank, an outlet for the digested slurry and the gas delivery system for taking out and utilizing the produced gas.

This project is also useful for students to have a hands-on learning experience in constructing a Mini Biogas Plant, using locally available material.



**Material Required:**

1. Empty PVC can 50 ltrs capacity: 1 No. (to be used as Digester Tank)
2. Empty PVC can 40 ltrs capacity: 1 no. (to be used as Gas Holder Tank) (Make sure the smaller can fits inside larger one and moves freely)
3. 64 mm dia pvc pipe: about 40 cm long (to be used for feeding waste material)
4. 32 mm dia pvc pipe: about 50 cm long (fixed inside gas holder tank as a guide pipe)
5. 25mm dia pvc pipe: about 75 cm long (fixed inside the digester tank as a guide pipe)
6. 32 mm dia pvc pipe: about 25 cm long (fixed on digester tank to act as outlet for digested slurry)
7. M-seal or any waterproof adhesive
8. Gas outlet system: Please see Step 4 below for required materials and construction

**Follow the steps in the video:**

<https://www.youtube.com/watch?v=mWefbc1spd0>

# Model of an eco-house/ Canes in Ecobuilding



## **Aims:**

- to raise awareness on youth on the necessity to educate young people about the value of natural resources and how they can be used in natural building
- to enable young people acquire new skills and techniques through practical and real experience

**Target Group:** Youth and people interesting in natural building

**Number of people required for work:** 10-15

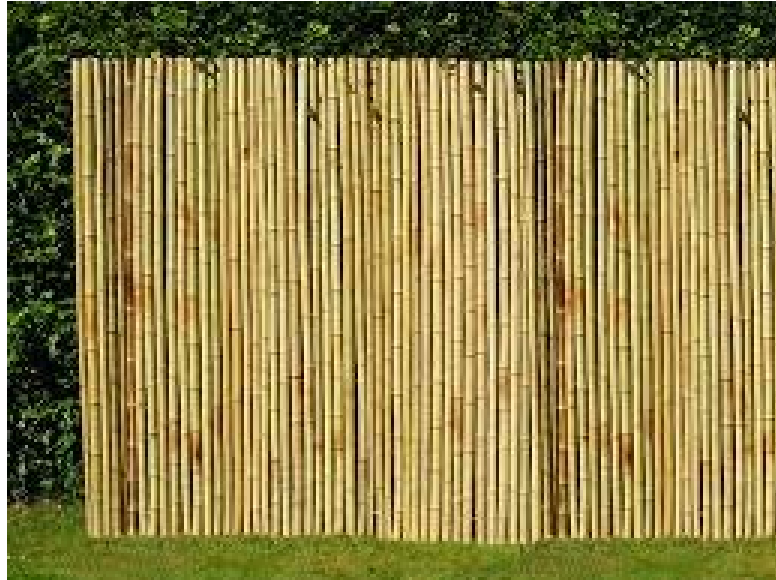
## **Materials required:**

- Tape measure
- Chalk strings
- canes poles (4 big, the rest medium and small)
- Shovel
- Concrete
- Cinder blocks
- Fern
- rope
- Hacksaw
- Hammer
- Nail
- Heavy duty plastic or tarp
- Duct tape

**Steps:**

1. Create a design of the canes house on paper. Make the design as simple as possible so that it will be easier to accomplish.
2. Measure the area in your garden where you will erect the canes house. If you have a secluded part in your backyard, choose that area for some privacy. Limit the height of the canes house to the same height as your perimeter fence so that it does not stick out. For a garden canes house in an average-size backyard, a 10-foot-wide by 8-foot-deep would do just fine.
3. Mark the areas using a chalk string. Mark the four corners where each of the main support canes poles would go.
4. Dig holes about 30cm deep each.
5. Put canes poles inside the holes. To keep it strong, pour concrete first into the hole, then before it dries, place each post in each hole. Use the biggest canes as posts, two at about 6 inches in diameter and about 2,40 m long on one side and 1,8m in diameter and 2,7m long for two on the other side. Doing one side higher than the other provides a slanted roof so that when it rains the water will slide downward.
6. Bury 30 cm of the canes underneath the soil . These posts should be strong enough to hold the rest of the structure.
7. Use a marker pen to measure from the soil about 30 cm high up on each canes post. This will be the height of your canes floors. Raising the canes floors prevents water on the ground from entering through the floor gaps. It also provides air ventilation as the soil gets too hot during sunny days.
8. Place a few layers of cinder blocks up to 30 cm at different areas of where the floors should go for added support.
9. Start placing four medium-size canes poles on each side. Two should be at least 3,6m long and the other two at least 3m long. The 3,6m ones will go on the front and back and the 3m ones will go on each side. The extra length will provide extra overhang, about a foot on each side.
10. Tie each post using rope. Ask another person to help you hold the other end as you tightly tie up one end. You can reinforce by using nails to connect each end or corner to the support post, and then tie the rope around each corner for a stronger support.
11. Lay down your canes floors one at a time. Tie each end on the floor frames for support. Do this until the very last piece, ensuring each one butt joins the other
12. Create a wall frame, corresponding to the floor frame. Start placing four medium sized canes poles on each side. Mark the four big canes posts from the floor at least 1,5m high. The 1,5m mark would be the location where you will tie up the canes walls to. Two should be at least 3,6 m long and the other two at least 3m long. The 1,5m ones will go on the front and back, and the 3m ones will go on each side. The extra length would provide extra overhang, about a foot on each side.
13. Put up the canes walls, measuring 1,8m each. Tie each one to the canes wall frames with rope. Leave a 30 cm opening at the front for the entryway to let the breeze in. For air circulation, you can leave five open slats at the center of the left and right wall.

14. Put up the roof frame. Put at least 6 evenly spaced medium-size canes and tie them up on the top frame.
15. Add thick layers of fern. Lay them one by one on top of the roof frame, layering one over the other. Make sure to tie each one with smaller rope along different areas. Cover as much as you can. Line with heavy plastic from the inside; use duct tape to adhere them on the underside of the roof frame on each side.





# Building ECO-kitchen



**Target group:** group of people that might be interested in having a place of reunion, or group of people interested in learning the basic of eco building.

**Objectives:** learning the basics of ECO-Building through a construction that could be of immediate use and fast development.

The guidelines given in this tool are to be applied depending on your limitations, taking into account the budget limit, the regulations regarding the maximum allowed size and other construction limits, and other factors that may apply as available materials and the local temperature.

## Parts

- *Making of the kitchen frame*
- *Appliances development*

*To these construction basics we would add as many enhancements as the group see fit to the time frame or as an upgrading for later. Such as a Rain Collecting system, Biogas System and other enhancements that the organization see fit.*

**It's important that before the development of these parts of the project, the safety rules and measurements are explained to the participants.**

## Making of the Kitchen Frame

**Participants needed:** 6 persons.

The number may vary depending on the objectives of the activity. If the objective is the learning process we recommend that the working groups vary in each dynamic for learning purposes. The number could always ascend depending on the available tools.

1. Once the location and measurements have been decided, Decide where the frame is going to be, make the correspondent marks in the ground.
2. To place the Lumber on the ground we'll bury 1/5 of the height desired underground. So you will need to drill holes of at least that height.
3. Once dug the hole put insert the lumber into it. You could add a sticky component to make it more secure. We'll secure the lumber by nailing stakes from above ground to the inside part of the lumbers, in an almost parallel position as near as possible to the lumber.
4. We put the frame on top of the Lumbers.

\* If the weather conditions require an actual wall to protect you from rain, or even cold. First we would make the walls out of pallets like shown in the Sources. We continue isolating them with straw and plaster on the inside.

## Appliances development

To be able to work on this part we recommend you use the sources that we will list at the end of this guide.

This part is composed of small parts that you could fit into your activity as you see them convenient.

**Participants needed:** as much as you want.

## Rocket Stove

An alternative cooking source that is inexpensive, quick to put up, relatively mobile, and easy to use. We recommend you to do it with adobe bricks. Both tutorials in the Sources below.

## Sink

For the sink we will use the Tadelakt technique. How to make it:  
<http://lacumbreverde.com.ar/TadelaktEnglish.htm>

## Sources and other Useful material

- [Two \(2\) Methods of making Adobe Bricks](#)
- [Pallet Walls](#)
- [The Cob Oven Project](#)
- [Brick Rocket Stove](#)