



The Agahozo-Shalom Youth Village

How to build a Nature Hut

By Melissa Flint and Nathan Pell, 2012



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Introduction

This is to provide a background of the nature hut built at Agahozo-Shalom Youth Village during September-October 2012. We used a fusion of building techniques including: traditional Rwandan building techniques, wood frame construction and earth bag techniques. This document is also to provide instruction on how to continue a project like this in the future.



Sitting area in the ASYV Nature Park

Background

The Nature Park hosts more than 72 species of trees and 90 different species of birds have been spotted in the park. It is also home to many plants, reptiles, insects and small mammals. It was created in 2011 and now the village wants to encourage more people to use the Nature Park by expanding the education and infrastructure in and around the park.

Reasons for Building this Natural Meeting Space

- To encourage more use of the Nature Park. This is a space to sit and to learn more about environmental education.
- Make more spaces for families, staff, visitors to have meeting areas. This place provides another area for quiet study and contemplation.
- To give the students the opportunity to learn natural building skills. This project involved 27 members of the Natural Building team. This project was to encourage these students to take leadership in their village and to learn new building techniques.

How to Build a Hut

1. Choose a Site

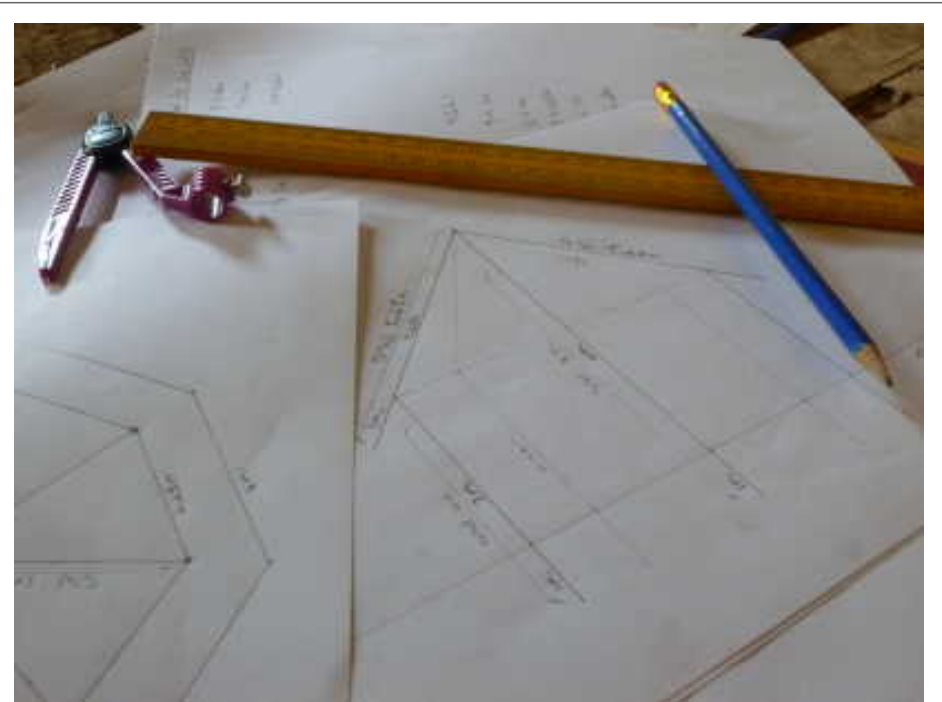
Choose a site where there is at least 30 m² of free space and is relatively flat. We wanted the site to be close to the Nature Park, but not necessarily inside the park because the Nature Park is small (1.7ha). We also didn't want to do too much to level the ground, or clear away bushes. We found the perfect spot 200m away from the park with amazing views of lake Mugesera.



Open grassy area with great views of the surrounding areas

2. Plan

It is important to plan the building so you know exactly what dimensions it will be and what materials you will need.



Plan of the hut

3. Choose a Good Team

We formed a Natural Building Team so students could learn how to make the hut and continue more in the future. The students were asked to write a letter of interest that showed they had motivation, good time management, could work in a team, were hard working, had willingness to learn and teach others. We also had help from the maintenance team of the village, six families and the environment club.



Building Team on the first day of work



Our construction team

4. Prepare Materials

To prepare for the hut we needed the following:

Benches

- 140 rice bags of size 25 kg
- Soil to fill the bags. Many earthbag techniques they encourage using specific mixes of sand, soil, and even cement. However, this technique was developed as a way to build almost anywhere, using what is available on site. As such, we decided to use the soil we had near the site.
- 40 m of barbed wire. Barbed wired is use to reinforce the earthbags between layers.
- 20 m of 2 m wide chicken wire. This is used to help reinforce the benches and make it easier to plaster
- 2 kg of nails to hold the chicken wire to the benches
- 10 bags of cement to plaster the benches



25 kg rice bags



Soil was taken from the near the hut

Structural Supports

- Wood- There is an eucalyptus woodlot just above the school. We took eucalyptus trees from this woodlot to make the structural support. We took about 50 poles ranging in height from 5m to 2.25m.
- Nails- 11kg of size 6, 2kg of size 8, 3kg of size 10, 1kg of size 12



Cut eucalyptus trees with peeled bark



Nails



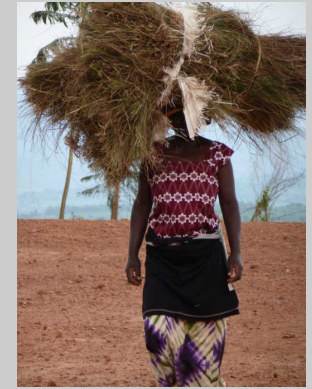
Carrying the big center pole

Roof

- Grass. There are many different types of grass used in traditional Rwandan houses. The grass used for the roof grows on the slope between the dining hall and the school. It took 3 people 5 days to cut and carry the grass for the roof.



Inshinge grass



Carrying the grass



Bringing rocks to the work site



Bringing gravel to the work site

Floor

- rocks
- gravel
- sand
- 15 bags of cement

5. Clear the Surface and Measure



Clearing the hut area



Taking measurements. The poles were marked for 3m from the center pole and 2.4m from each other.

Structural Support



Dig holes between 80 cm to 1 m deep for each pole



Use stones to hold the pole straight.



Use a level to check that the poles are straight.



Mix the cement using sand, stones, cement and water



Pour the cement in the holes, layering stones and cement



The building team after placing the first poles



The building team after placing the first poles



Team work to cement all the poles



Nine poles were placed. The center pole was 3.6m above the ground. The eight other poles were all 2.4m above ground.



Once the main poles are cemented in, the rest of the roof and cross beams can be placed. A level and string can be used to make sure everything is together.



Connection of the main poles and roof cross beams



Roof center piece



Building the roof



Roof center piece



Poles 4m long, were placed from the roof center to the edge



Triangle shape poles for support



Small poles were placed perpendicular to the roof poles to support the grass



We learned that it is not a good idea to work below people who are using hammer and nails above.



Building the roof



First cut the grass

Roof

The roof was created in the traditional way of a Rwandan house. Inshinge grass was cut from the area between the dining hall and school and carried to the hut location. Once enough grass was collected, small bundles were made and placed carefully on the roof structure. After 1-3 strong rains, more grass was placed on the roof. The rains help to compact the grass and show where more grass is needed.



Gather the grass



Carry the grass to the hut



Bundle the grass and place on the roof



Placing bundles on roof



Layer the grass so it covers all parts of the roof



Building the grass roof

Benches

The benches were made using earthbag techniques. We took many of the specific techniques from a project at the Aman Setu school in Wagholi, India. They built an art center called the Kaleidoscope using earthbag and natural building techniques.



First we dug near to the building site and filled the bags with soil.



Then we sewed the bags shut using needles and string



We placed the first layer of bags around the outside making sure to leave space for an entrance and exit



Second layer of bags



We placed two lines of barbed wire between the earthbag layers. This is to reinforce the benches to stop them from shifting.



Fourth layer of bags



After placing each layer of bags we compressed them by jumping, dancing, and hitting them with a wooden log



When the soil is compressed, it makes the wall more solid and strong



When the layer of bags were about 45 cm above the floor level, we covered them with chicken wire



The chicken wire acts to reinforce the bench and make it easier to plaster with cement



The chicken wire was tucked in and nailed to the bags



The benches were first plastered with a coarse layer of cement



Cement plaster around the outside and inside of the benches



The benches were finished with a layer of smooth cement

Floor

The floor of the hut can be left as bare earth, gravel, or other. We decided to make a strong floor with rocks and cement so that it could last a long time. We also extended the floor outside the benches to protect the building from rain. This is not the only way to make a cement floor. Gravel can be used instead of big rocks as a base for the floor.



Digging to remove roots of grass and to make the floor level



Preparing the floor of the hut



Place rocks using string and a level



Building the floor



Rock floor



First layer of coarse cement



First few lines of level fine cement



Many people make the work lighter



Finishing the cement inside, placing rocks on the outside



Smooth finish



Cement on the exterior to protect the building



The Natural Building Team on the last day of work



A rainbow marks the end last day of work on the hut

Opening Ceremony October 22, 2012

The Natural Building team opened the Nature Hut on October 22, 2012. The team invited friends, family, and the directors of the village to help celebrate the achievement. Anne Heyman was in the village during this time and helped with the ribbon cutting ceremony.



Anne Heyman cutting the ribbon to open the hut



The Natural Building team with their certificates of achievement



The finished hut



Melissa and Nathan on the last day of work

If you have any questions about this building project you can contact Melissa Flint (mtflint@gmail.com) or Nathan Pell (NatanPell@gmail.com)