

ANRI

- The Agriculture Natural Resource Institute (ANRI) is a secondary education institution specifically focused around agricultural education. It is located just outside Dangriga, Belize.
- The school rests on 240 acres, in the midst of citrus fields and jungle and is about a thirty-minute drive from Dangriga down a bumpy, country road. They raise pigs, chickens, rabbits, and an assortment of vegetable crops, including okra, sweet peppers, hot peppers, tomatoes, and beans, all on just 30 acres of production.
- A functioning seedling house is important to ANRI because they use much of what they grow for school lunch. They also send some of the vegetables home with their students.

The Old Seedling House



The Original Seedling House at ANRI

Since 2008, the students had been using a temporary structure made of rough lumber supports and a thatched roof. Because there were no walls, their small tray of seedlings were covered loosely in netting, held up by an unsteady piece of PVC pipe. This seedling table was insufficient for the school's needs in several ways:

- The table was small and only held a limited number of seedlings.
- The netting was not attached tightly to the structure so the seedlings were still vulnerable to pests.

The Ministry of Agriculture in Belize provided the basic design for the seedling house. It was our job to identify cost effective materials to build the structure and to create seedling boxes that optimized production of seedlings in the structure.



The Proposed Seedling House from the Ministry of Agriculture

The New Seedling House

- Nine students from the University of Arkansas with various backgrounds worked together to plan, design, and build the new seedling house for ANRI.
- The location of the seedling house was determined by ANRI staff, which would be located behind their gardens and greenhouse.
- Four treated lumber posts were placed at the corners of the structure to ensure stability while additional posts and support beams were placed in strategic places to keep the structure sound.
- PVC pipe was used to build the concave-shaped roof, which would support the netting that covered the seedling house. The structure was fitted with the netting from roof to floor and secured in a manner so that it could be removed before severe weather, such as hurricanes.
- Gravel was placed inside the structure to level the floor and also atop of the netting on the ground to keep it secure from the wind.
- A double door was constructed for further protection against insect infiltration.
- Four tables were constructed to hold the seedlings off the ground. Each table holds ten seedling trays, totaling forty available trays for plant production. The original seedling structure only supported eleven trays.



First day of work at ANRI constructing the support posts.



Brady Long finishing up the seedling house



Completed table for the seedling house

Results

- It took a week to complete the seedling house structure. It's finished dimensions were fourteen feet wide by twenty-four feet long by eight feet high. They will be able to hold forty seedling trays compared to the eleven from the previous seedling table use from 2008.



Completed seedling house being inspected by ANRI staff



Inside the house with the completed seedling tables



Completed house with all participating UA students and ANRI 3rd form class

Sustainability

- **Social Systems:**
- involves the social behaviors, interactions, and dynamics in relationship to environmental sustainability.
- Most Dangriga farmers purchase seedlings from the government run Central Farm. Seedlings are costly, varieties are limited and sometimes unavailable when needed.
- The seedling structure at ANRI directly serves students and faculty and also has the potential to benefit the surrounding community as well if ANRI chose to have a seedling market.
- The seedling structure is an appropriate, reliable space for sustainable agriculture learning to occur. Having such an experience in school could help young graduates of ANRI better manage their own farms, thus leading to better production, and possible social mobility.
- There is a community investment across the board, which leads us to believe that the seedling structure will continue to be useful to ANRI and empower the local community for many years to come.

Sustainability

- **Managed System:**
- This system concentrates on the life cycle assessment of raw materials to finished products.
 - The house will enhance the plant production lifecycle. This is obtained by allowing to seedlings to be grown in an environment independent of pests and extreme weather. With an enhanced chance of survival, the reproduction is possible for many years, providing long term self sufficiency.
 - The netting used on the house was also UV and pest resistant which will increase the health of the seedlings as well as eliminating negative externalities caused by the use of chemical pesticides.
- **Built Systems:**
- involves the design and construction of buildings, including related infrastructure, in connection with the use of natural resources and environmental health.
 - The materials used were locally available, relevant goods.
 - The structure was designed to maximize seedling protection in several ways. For example, double door entrance and treated netting without the use of chemical pesticides.
 - The floor plan design maximizes usable space in the structure.
 - The house was constructed in a way that the netting and the seedling trays could be removed and kept from damage in severe weather conditions, thus preserving the usability of the structure for many years to come.

Reflections

- In no other study abroad program are you as a student able to learn through service or asked to look a global issue in the face and have the opportunity to solve it. Students are given responsibility and asked to step up as leaders.
- Sustainability is difficult to fully achieve. Getting everybody to agree on something takes constant communication and the ability to compromise; however, the end results far outweigh the obstacles and complications.

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