ENGINEERS WITHOUT BORDERS -USA
JOHNSON SPACE CENTER PROFESSIONAL CHAPTER

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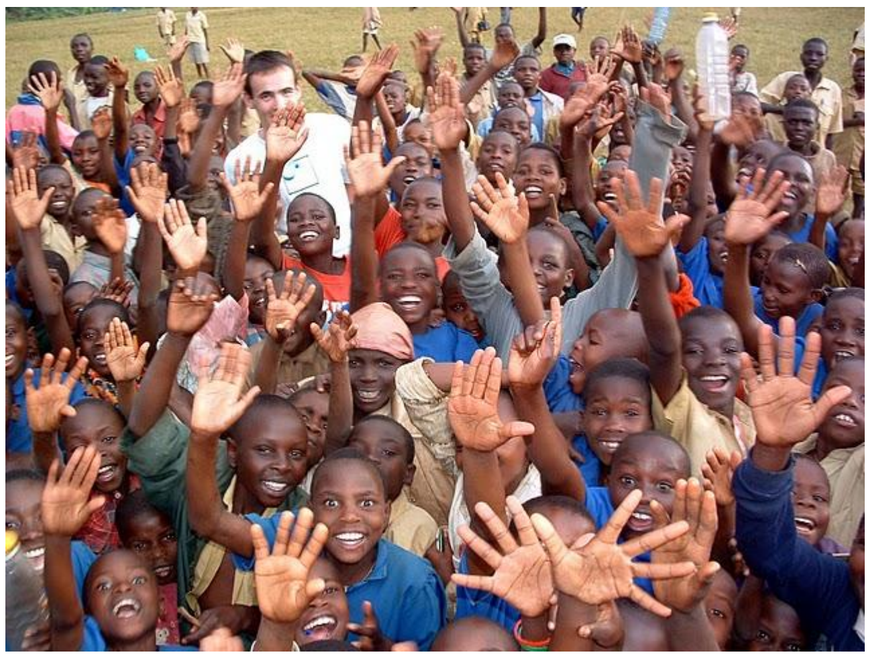
inclusion & innovation

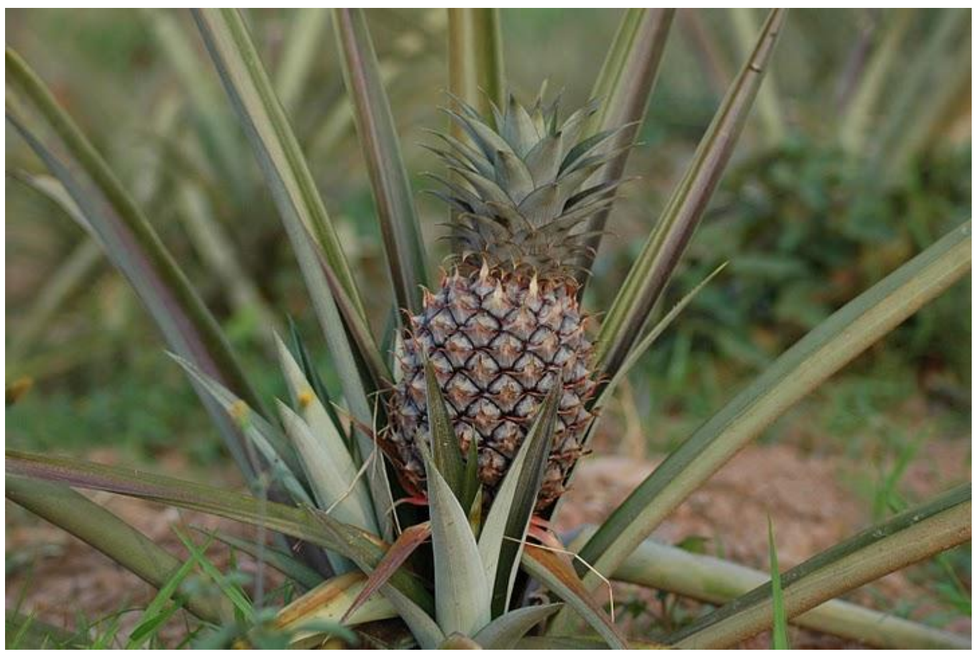
Fruit Drying for Orphans in Rwanda



The Engineers Without Borders Johnson Space Center (EWB-JSC) chapter is an association of JSC employees, contractors and other professionals in the Houston/Clear Lake area who volunteer their time to participate in sustainable projects in the developing world by addressing people's basic human needs and provide necessities by partnering with the local communities.

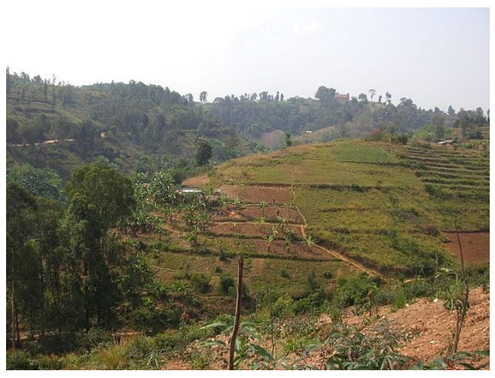
The EWB - JSC Chapter plans to provide a way for L'Esperance Children's Aid Orphanage in Mugonero Rwanda to become economically sustainable. The chapter has been working with the orphanage since 2005 and have teamed with the director to identify new projects that would benefit the orphanage. Previous projects have included rainwater catchment systems to provide additional water for the orphans during the dry season. Since the water collected for drinking is mostly runoff from the mountains a water treatment system was also designed and built on the grounds of the orphanage. The current project that the chapter is working on is designing a fruit drying system.

To assist the orphanage in becoming economically sustainable the EWB-JSC chapter was asked to help design a system that could dry the large amount of fruit that the orphanage is growing in the surrounding hills. While a portion of the fruit grown goes towards feeding the orphans, the extra will be used to dry and sell in the open market providing a source of income for the orphanage.

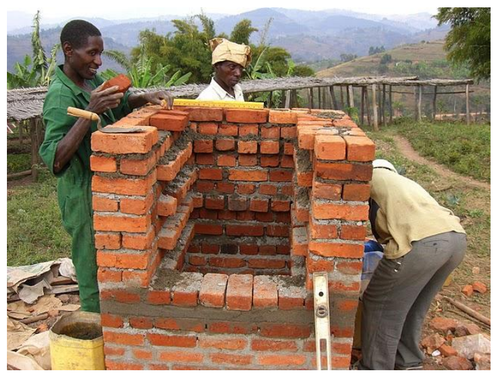


Fruit in the Mountains of Rwanda

Growing fruit in the mountains of Rwanda is not easy due to the slope of the ground, but L'Esperance orphanage has been successful. They are currently growing pineapple, papaya, banana, and mango. They are growing enough fruit to harvest approximately 90kg a day which is more than enough to feed the 100 orphans and the orphanage staff and still have a large surplus to dry. EWB-JSC members were at the Mugonero orphanage back in 2008 installing a prototype of what the original fruit drying system was planned to be. After returning to Houston the team has worked on improving the design of the solar dryer to function more efficiently and when there isn't sufficient sunlight.

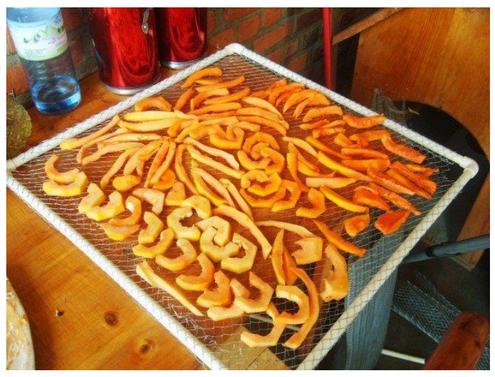


Hills of Rwanda where the fruit is grown



Local workers laying brick for the prototype fruit dryer in Rwanda

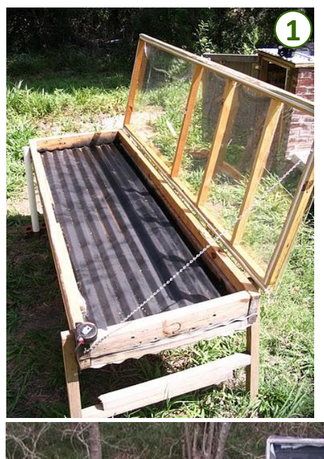
Jack and Chris working on the solar collector for the prototype fruit dryer



Tray of cut up fruit for testing the prototype dryer

Redesign and Testing

Solar Dryer



In order to optimize the fruit drying process, EWB-JSC members developed two fruit drying design options. One utilizes the suns energy in a solar dyer. The other utilizes the waste heat from the orphanages cook stove kitchens. A half scale replica of the kitchen and cook stoves were built by the group at the EWB-JSC field site for prototyping and testing. Testing on both types of dryers is ongoing along with options for utilizing both options to allow for maximum amount of fruit drying.

1- Completed solar dryer prototype for testing
2- EWB-JSC dryer team members building the freestanding solar dryers
3- Chris and Tyler-Blair assembling the racks for the fruit to dry on

Thermal Dryer

4- Jack measuring the half scale kitchen structure
5- Mike taking measurements of the thermal dryer box
6- Tyler-Blair assembling the cook stove

Mugonero, Rwanda