UNIVERSITY of DAYTON
The ETHOS Center

# ETHOS Summer Immersion 2017
# Cochabamba, Bolivia
# Thomas Devine with CECAM

## Abstract

This summer, I traveled to Cochabamba, Bolivia to work with CECAM on the Cochabamba Pedal Project. This project aims to create pedal-powered machines of various types to ease the living conditions of people with a wide range of needs or disabilities. It was an amazing opportunity to be able to apply my engineering knowledge and experience to assist this worthy cause.

## Introduction

In Bolivia, a large amount of every family's time is spent doing trivial tasks and chores by hand because they do not have access to advanced technologies to help deal with these regular tasks. CECAM's goal is to create devices that will ease or hasten these chores to allow families time to educate and work toward a better life.

## Bicimaquinas

CECAM developed the Cochabamba Pedal Project to find sustainable solutions that provide opportunity for communities to emerge from poverty. Bicimaquina or bike machine is a term used to describe a pedal-powered machine designed to lessen the burden of some regular task. CECAM produced multiple models including the biciliquadora (blender **F1**), bicimolino (corn grinder **F4**), bici cargo (cargo bike **F3**), bicidesgranadora de maiz (corn de-grainer **F2**), and the bici de helados (ice cream bike).

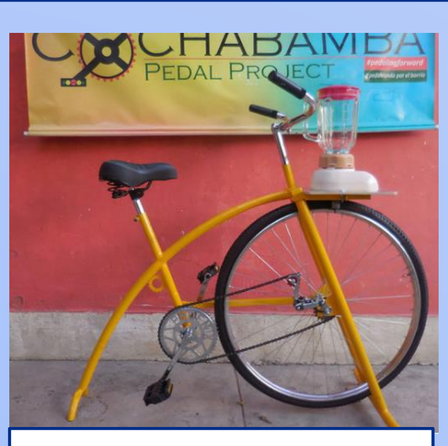


**Figure 1**


**Figure 2**

**Figure 3**

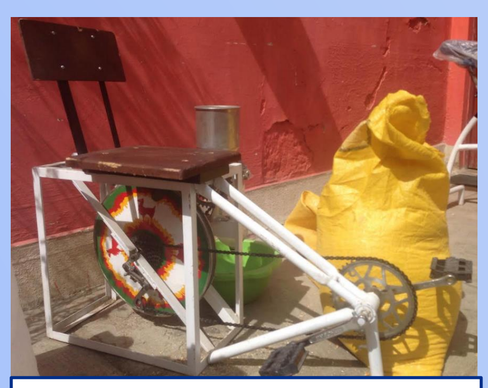

**Figure 4**

## La Bicilavadora

Once I was comfortable communicating technically in Spanish I was given the task to design a bicilavadora (washing machine bike **F5**). After two weeks of researching and drawing, I presented the idea to Freddy (pictured) and we began working together to bring the prototype to life.

**Figure 5**

The initial design requirements for the washer included ability to wash tough work clothes, pedal-powered (no electricity), and simple to use. In the end, we had a fully functional prototype which not only met the initial requirements but was also fully portable, minimized water use and could be used with any bike.

## Recommendations

One major design recommendation for the bicilavadora which was incomplete upon my departure is to add a hole in the barrel to allow for draining the dirty / sudsy water and for refilling with clean water without removing the barrel from the frame. This will make a complete wash much less laborious. Also, various measurements have been altered since construction including a smaller barrel.

## Acknowledgements

Many thanks to all of my fellow ETHOS students especially to Caroline, Alana, and Ashley for making the experience a whole lot of fun. Thank you to Sustainable Bolivia for your warm hospitality and all of the memories you left us! Thanks to all of the volunteers from around the globe who we were lucky enough to encounter and learn from. And a huge thank you to the ETHOS Center for all of the hard work you do to make sure everybody has an awesome experience.

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