

## **Problem Overview**

Biomimicry is an approach to innovation that seeks sustainable solutions to human challenges by emulating nature's time-tested patterns and strategies. In this application, the shift from a traditional commercial beef environment to grass fed beef stems from various human health benefits as well as significant soil health benefits if the cattle are managed in a way that mimics natural systems. When biomimicry is implemented, maximum soil health, herd health, and profitably is achieved. We seek to create a regenerative agricultural system that can maintain its own soil health due to mimicking the cattle's natural environment. Current methods accomplish this with a minimally-labor-intensive strategy called rotational grazing: a process that moves cattle multiple times a day to graze on fresh grass.

## **Mission Statement**

Our mission is to engineer a solution that implements biomimicry through a mobile grazing cell; as a result we will optimize utility of resources, increase economic growth, and redefine regenerative agriculture.

### Constraints

- Proposed Cost Limit: \$25,000
- Mobility
- o 50 ft. by 100 ft.
- Contains 100 cows
- Water Troughs
- Function over uneven terrain
- Must collapse for transport

## Objectives

- Implement sensor to monitor water level
- Modular design
- Design should appeal to ranchers on land used to grow cash crops as well as ranchers using land not suitable for farming

Bioengineering<sup>1</sup>, Environmental Engineering<sup>2</sup> & Mechanical Engineering<sup>3</sup>

### **Hose Bridge and Chassis** Assembly

• Provide framework to support water trough and generator. o Distribute water to opposite





- R1 tread agricultural tire for optimal traction and large contact area between lugs.
- Maximum load capacity of 495 lbs. Spring for suspension and smooth
- travel on uneven ground.

### **Knuckle Joint Assembly**

- direction (horizontal).
- Designed to allow system to follow contour of uneven ground.

• System must move in y-direction (vertical), but not in the z-

Automated Method: Annual Sum	Conventional Method: Annual Sum
-\$23,447.25	-\$7000
\$202,697	\$99,035
\$162.072	\$99,035
\$159.504	\$99,035
\$162,072	\$99,035
\$161,463	\$99,035
\$159,504	\$99,035
\$162,071	\$99,035
\$159,004	\$99,035
\$162,072	\$99,035

	Automated Method	Conventional Method
est Rate	4.5%	
Present e (NPV)	\$1,674,462.29	\$977,350

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