Team Name: Farming the Unfarmable

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Project Title: Farming the Unfarmable

Introduction:

This project our team has decided to tackle one of the world's biggest issues, world hunger. Some of the reasons for this is because there are millions of people living in countries that have little to zero farmable land. This is a huge problem because there are 100 million people going hungry every day. 25,000 people die every day from hunger. So our solution is to find a way to make infertile land fertile. There are many solutions. One of these solutions is using organic matter to fertilize the soil.

Background Research:

The desert of New Mexico is actually called the Chihuahuan desert.The Chihuahuan Desert is the largest desert in North America. The largest gypsum dune field in the world is located at White Sands National Monument in south-central New Mexico. This region of glistening white dunes is in the northern end of the Chihuahuan Desert within an "internally drained valley" called the Tularosa Basin. Much of New Mexico is located in the Upper Chihuahuan Desert, which is colder than the Sonoran desert in Arizona. The saguaro cactus, a symbol of the wild west, is rarely found in New Mexico due to prolonged freezing temperatures. Does New Mexico’s desert get cold in the winter? New Mexico enjoys a fairly pleasant, arid to semi-arid climate that experiences snow during winter and hot weather during summer. The average temperatures in winter can differ depending on the location but generally, winter is quite cold at around 40°F. New Mexico’s desert is about 193,783 sq mi.

Sweet potatoes offer a plethora of nutritional benefits, being rich in essential vitamins, such as A and C, along with potassium and dietary fiber. Their complex carbohydrates provide sustained energy release, making them a valuable component for balanced meals. Additionally, sweet potatoes contain antioxidants that contribute to overall health. However, it's crucial to be mindful of their caloric density,

as excessive consumption could lead to an increase in calorie intake. Despite having a lower glycemic index than regular potatoes, sweet potatoes can still impact blood sugar levels, particularly in large quantities. Individuals with a predisposition to kidney stones should be cautious due to the oxalate content. Overall, incorporating sweet potatoes into a well-balanced diet can be a nutritious choice, but moderation and awareness of individual health considerations are essential.

Sweet potatoes are a nutrient-dense food, offering a wealth of essential elements. One cup of cooked sweet potatoes, weighing around 200 grams, typically provides approximately 180 calories, 41 grams of carbohydrates, 4 grams of fiber, and 3.4 grams of protein. Notably, sweet potatoes are a rich source of vitamin A, providing well over 100% of the recommended daily intake, contributing to eye health and immune function. They also deliver a substantial dose of vitamin C, supporting skin health and acting as an antioxidant. Additionally, sweet potatoes contain potassium, aiding in blood pressure regulation, and various other vitamins and minerals. While their caloric density should be considered, incorporating moderate servings

To grow sweet potatoes, start by choosing a suitable variety for your climate. Begin the process by either purchasing slips or creating your own by placing a sweet potato in water until it develops roots and sprouts. Prepare well-drained, loose soil with a slightly acidic to neutral pH, incorporating organic matter for nutrients. Plant the slips in rows, leaving enough space between plants, and bury them with only the top leaves exposed. Provide consistent moisture, especially during the initial weeks, and use mulch to retain moisture and suppress weeds. Apply a balanced fertilizer during planting and the growing season, avoiding excessive nitrogen. Carefully monitor for pests and diseases, removing weeds that may compete with the plants. Harvest sweet potatoes when leaves yellow or after the first frost, being cautious not to damage the tubers. Cure the harvested sweet potatoes in a warm, humid location for a few weeks to enhance flavor and storage capabilities.

Computational Modeling Planning

In our model we want to show how yams will grow in dry and arid conditions. With that information we will find a suitable solution and add it to our model. We plan on adding different variables

like temperature and humidity as well as fertility. This model will help us find a real world solution to this world wide problem. We are planning to use the Netlogo model titled “Bug Hunt Consumers” as a foundation to make changes from and build our model.

Resources

1. International Institute for Tropical Agriculture
2. Net logo model - https://ww.netlogoweb.org/launch#https://www.netlogoweb.org/assets/modelslib/Curricular%20Models/BEAGLE%20Evolution/Bug%20Hunt%20Consumers.nlogo
3. "Chihuahuan desert"
4. Centre for Agriculture and Bioscience International
5. "YAMS: Post-Harvest Operation"
6. Chihuahuan Climate