Hydroponic Agriculture: Commercial vs. Individual Growth in New Mexico

Sanchez, Uriah (School: Los Alamos High School)
McTeigue, Xavier (School: Los Alamos High School)
Holesinger, Gabriel (School: Los Alamos High School)

According to the USDA, New Mexico farms consume 1.8 million acre-feet of water per year. Due to New Mexico's limited water supply, the State cannot produce enough crops to support itself and imports more than $4 billion of food annually. This experiment will test whether the hydroponics system will help the state conserve water compared to conventional farming methods, enabling New Mexico and individuals to be more self-sufficient. The project included one plot of lettuce grown using conventional farming techniques, and another plot of lettuce grown using a hydroponic system. The conventional farming plot contained fertilized soil and was given tap water every week for a total of two months. The hydroponic system contained no soil and allowed water with floral growth circulate from a reservoir to the roots of the lettuce for a total of one and a half months. After harvesting, the amount of water used by the conventional farming plot totaled 960 ounces, while the hydroponics system only required 512 ounces of water. The startup, electrical, and water expenses were calculated by Santa Fe county utility costs to analyze the cost comparisons of each farming system. The results proved the hypothesis correct. The hydroponics system was more efficient in conserving water and maintaining the amount of agriculture produced than the conventional farming system, yet cost more during the production. A database will be modeled to predict the amount of water conserved and the cost comparison of a hydroponic system over time. The hypothesis was also proven correct in the electricity aspect of the experiment. The conventional farming method only required electricity in the lights, and therefore the hydroponics system utilized close to 1,400 more kilojoules of electricity per day.

Awards Won: