

Sustainable Agriculture through Automation by Open-Source Hardware and Software

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PROBLEM STATEMENT

Food insecurity, caused by low income and limited access to healthy food sources, is a prevalent issue in the United States, as is shown by figure 1.

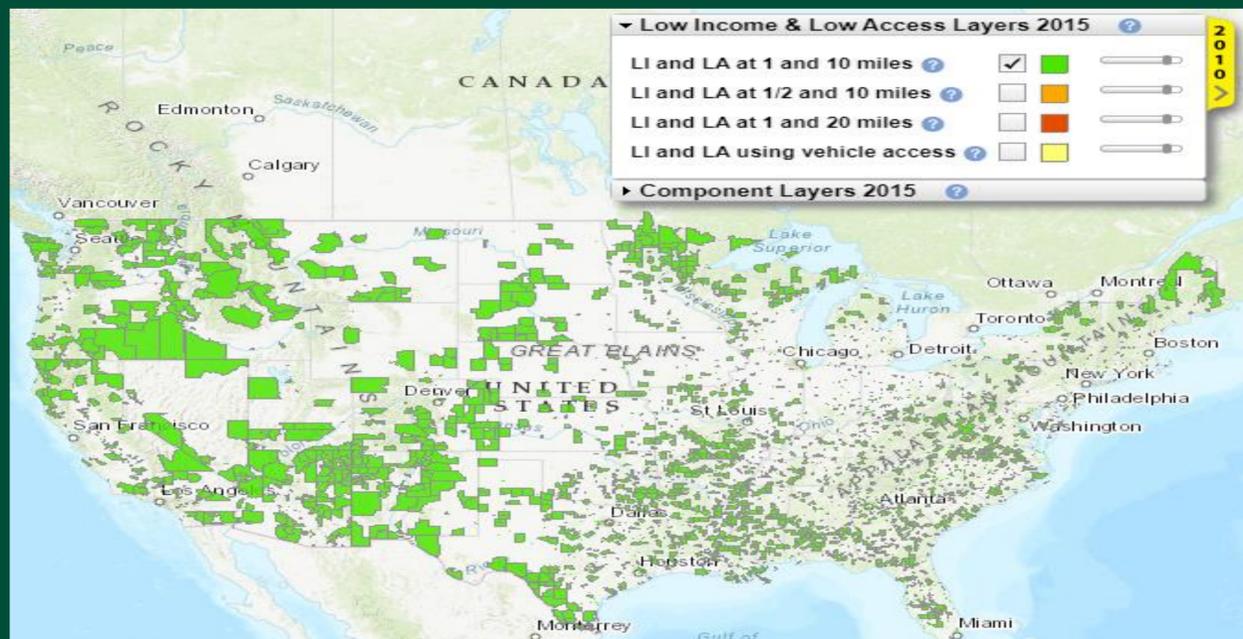


Figure 1: 2015 Map of communities with food insecurity as a result of low income and lack of proximity to fresh, healthy food sources. Photo Credit: ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas/

BACKGROUND

It is clear that low-income communities face trouble acquiring plentiful, healthy food, but little has been done to address those with limited access. Urban communities where a significant portion of their members rely on public transportation and are more than a mile away from the nearest supermarket, face food insecurity. A similar case is made for those in rural communities where, despite having adequate transportation, the nearest source of organic produce is 10 or more miles away, thus creating food insecurity. For both of these types of communities an excess of distance and shortage of time and or lack of knowledge of biodiversity limit their members' access to affordable, healthy food.

SUMMARY OF WORK

Our team has designed an automated agricultural robot that reduces the task of farming/gardening to simply harvesting. It utilizes primarily open-source hardware and software to keep costs low. We have constructed a sturdy, tank-like body (see figure 2) on which will be a plow, a seed dispenser, (see figure 3) and a suite of sensors for collecting critical soil nutrients data and proper rover movement.



Figure 2: Robust tank body for movement in rugged terrain



Figure 3: seed dispensing mechanism

IMPACT ON COMMUNITY

- With large scale implementation, this will shift government funding from large subsidized agriculture to other programs in need.
- Increase in biodiversity and working knowledge of agriculture of the average person.
- Cheaper and more affordable, organic produce
- Increased access to organic produce in urban and large rural areas.