

Green Technology in California K-12 Education

Ánh Cao, Department of Applied Environmental Science
 CSU Monterey Bay, acao@csumb.edu



Background

The US Department of Education established a federal program called the Green Ribbon Schools initiative to award K-12 schools that incorporate project-based learning, healthy living, and sustainability in their curriculum. By incorporating these principles, these schools are providing green space and a green learning environment that is interdisciplinary. Research shows that green schools and green school programs can increase student attention and academic performance, and they can foster outdoor education and overall well-being. My research focuses specifically on K-12 schools awarded a Green Ribbon in California with the goal to determine how these schools integrate green technologies into their curriculum. Green technologies are technologies that do not significantly impact Earth's resources through the process of supply, manufacturing, use, and disposal. This is important because green technologies could provide solutions to reduce the impacts of climate change.

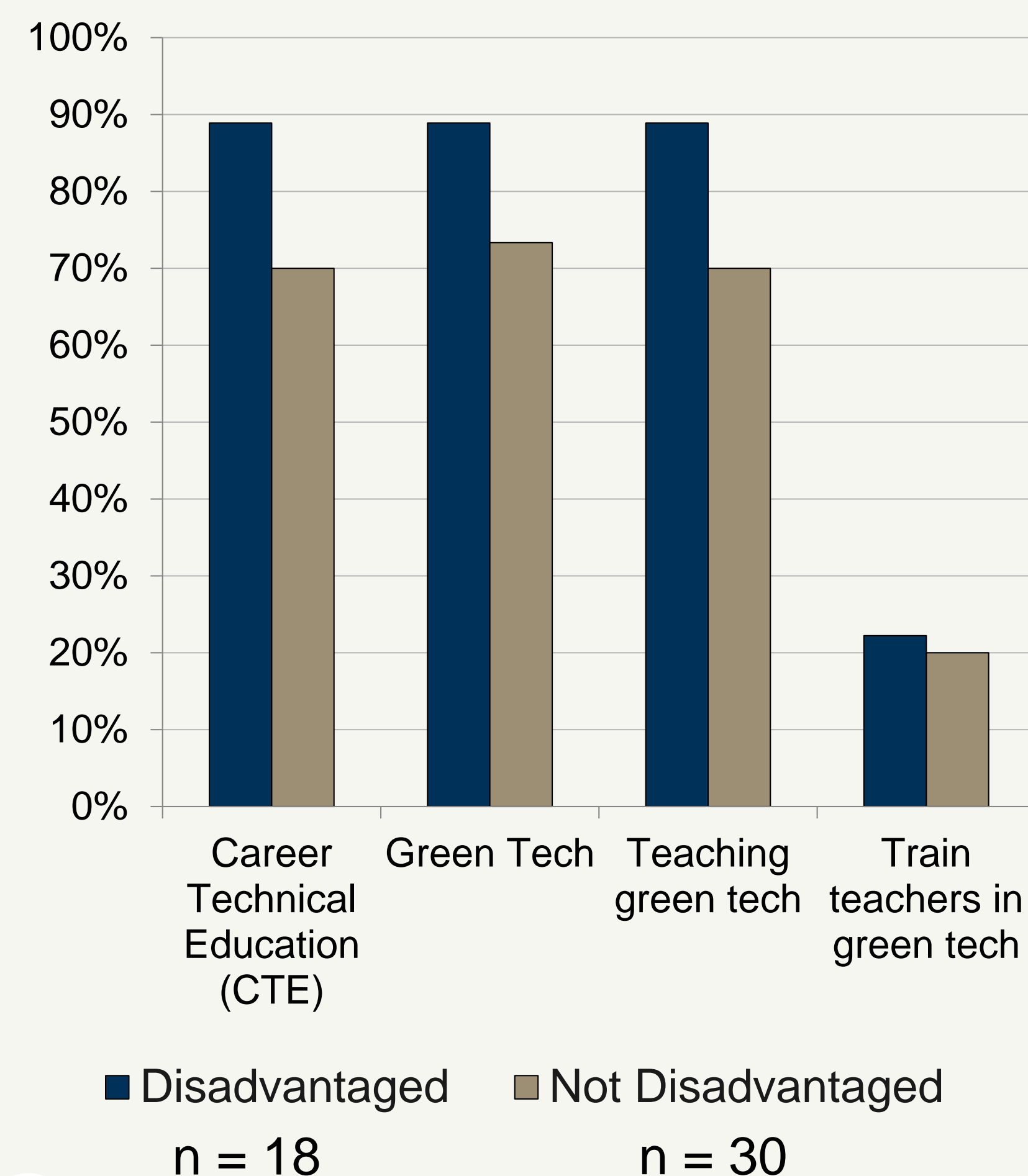
Method

- The schools were identified from the Green Ribbon awards page on the U.S Department of Education website.
- Schools were coded for whether they offer Career Technical Education, utilize green technologies in their curriculum, and train teachers in the use of green technologies.
- Schools were also categorized as public, private, and socioeconomically disadvantaged.
- 48 schools on the Green Ribbon awards website were reviewed from 2012-2021

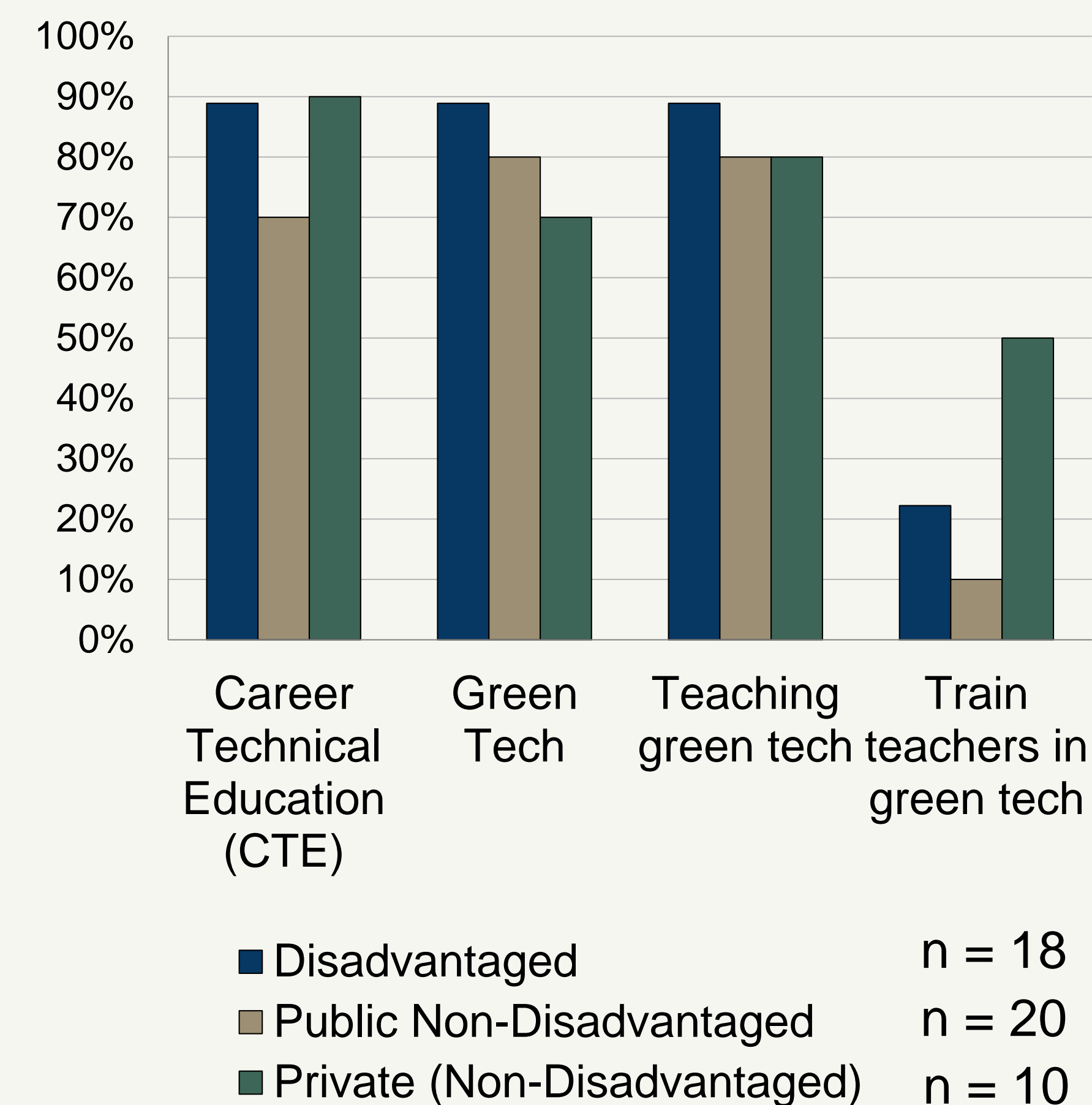
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Percentage of Schools that Integrate Green Tech into their Curricula



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Results

- Disadvantaged schools are more likely to offer Career Technical Education (CTE) and Green Technology courses compared to non-disadvantaged schools (Figure 1).
- While the percentage of private schools offering CTE is the same as non-disadvantaged schools (Figure 2), the percentage of private schools teaching students green technology is the same as public non-disadvantaged schools, but it still ranks lower than disadvantaged schools (Figure 2).
- Private schools offer more teacher trainings on green technology than disadvantaged and non-disadvantaged public schools (Figure 2).

Conclusions

Green technology is being taught in public, disadvantaged schools. However, in disadvantaged schools, the lessons and CTE pathways seem to be more oriented towards technical or labor-related skills in the energy and water sectors such as drip irrigation, refillable water bottles, installation of solar panels, energy and trash audits.

Non-disadvantaged schools have more diversity and complexity in the subjects related to green technology; the subjects they learned were in various sectors like transportation, agriculture, air, and greenhouse. Examples of non-disadvantaged subjects include constructing anemometers to study the wind speed in local environments, aquaponic farming, and operating an 18-foot geodesic dome greenhouse that functions as a model of sustainability.

These differences could be an educational equity issue; disadvantaged schools might not have the resources and funding to allow their students to explore diverse arrays of green technologies compared to non-disadvantaged schools. Public school teachers from disadvantaged schools receive less training in green technology curriculum compared to their peers in non-disadvantaged schools. This could impact the quality of education that students receive, and it could strain public school teachers who are asked to teach subjects without proper training.

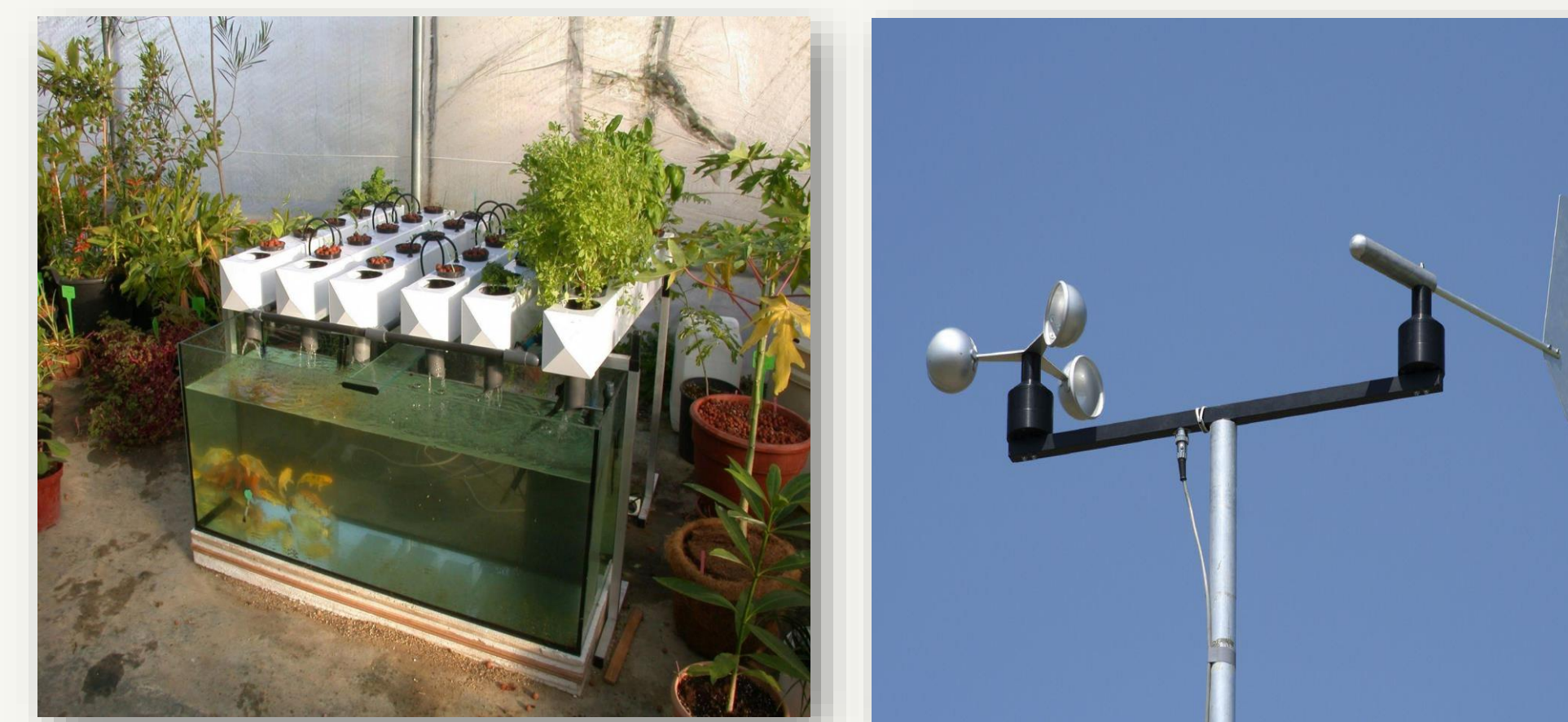
It is also important to note that the reason why the data shows public school teachers have less training could be attributed to training for teachers not being listed in the "Green Ribbon" award descriptions.

Examples of Green Technology in Disadvantaged Schools



Top row from left to right: Drip irrigation and water refills station
 Bottom picture: Solar panels

Examples of Green Technology in Non-Disadvantaged and Private Schools



Top row from left to right: Aquaponic farming and an anemometer used to study wind speed
 Bottom picture: Geodesic dome greenhouse