

# Compost on Rangelands – Studying the effects of a one-time application of compost to annual rangelands

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As gardeners, we know the value of compost. Many of us use it every day. From saving kitchen scraps to raking leaves and saving every green and brown material in our yard, nothing goes to waste. Why, because these are the ingredients of compost. Compost is like gold to a gardener. We rely on it for enriching our soil and making our plants thrive. Even farmers know the value of compost as many of them use it in row crops and in perennial crops like orchards and vineyards.



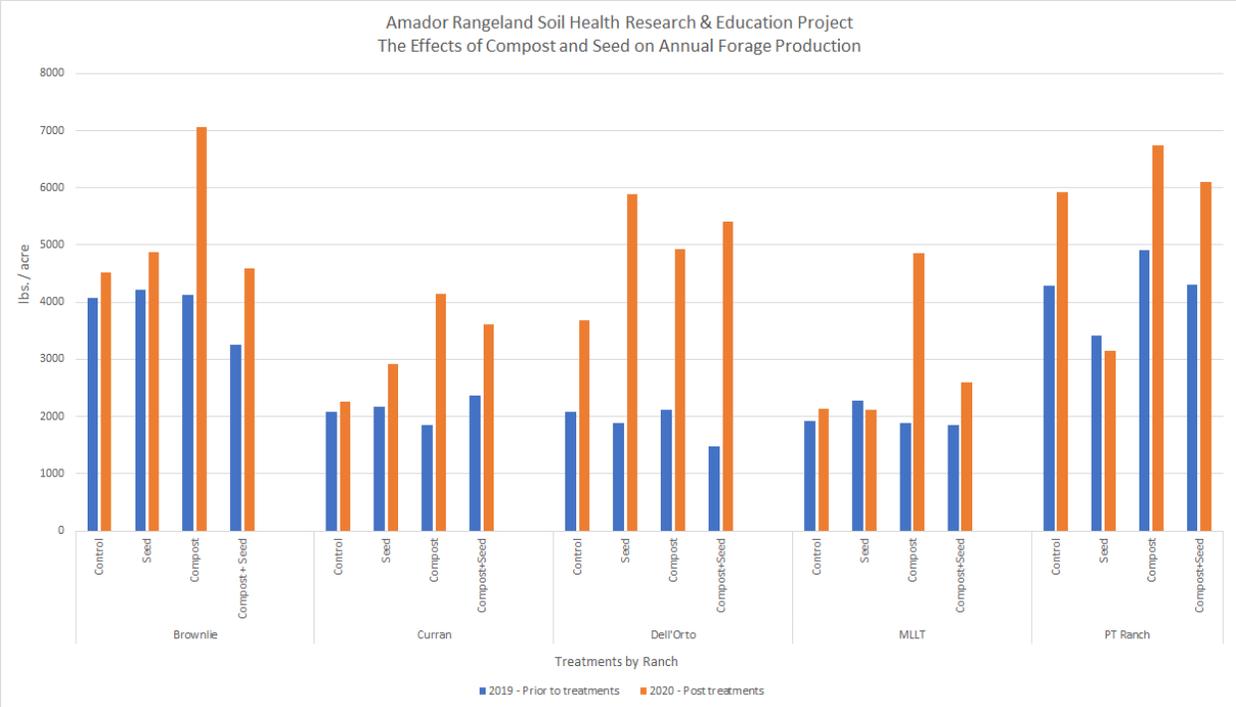
There is one sector of agriculture where we are just beginning to understand the potential value of using compost and that is rangelands. Rangelands cover more than half of California's land mass. These grasslands are comprised of mostly exotic annual grasses and forbs from the Mediterranean and are often some of the poorest agricultural soils in terms of fertility. Recent studies have shown a direct benefit from the one-time application of compost to rangelands, including increases in water holding capacity, forage productivity, and carbon sequestration (Silver et al 2010, Ryals and Silver 2013).

Based on these preliminary studies, this project is testing the one-time addition of compost to annual rangelands in an area that currently lacks localized data. By adding compost to the soil, we hope to see an increase in both soil fertility and water holding capacity which will ultimately increase the ability of desirable vegetation to be more resilient to climate variability and better able to compete against noxious weeds. In addition, the added fertility will make desirable forage more nutritious and more abundant for livestock, ultimately resulting in a financial benefit to the producer.

In the spring of 2019, we established research plots at five ranches in Amador County. At each location we setup a randomized block to test four treatments: 1) one-time application of compost, broadcast clover seed mix, compost plus clover seed, and an untreated check. Each treatment was replicated three times at each ranch.

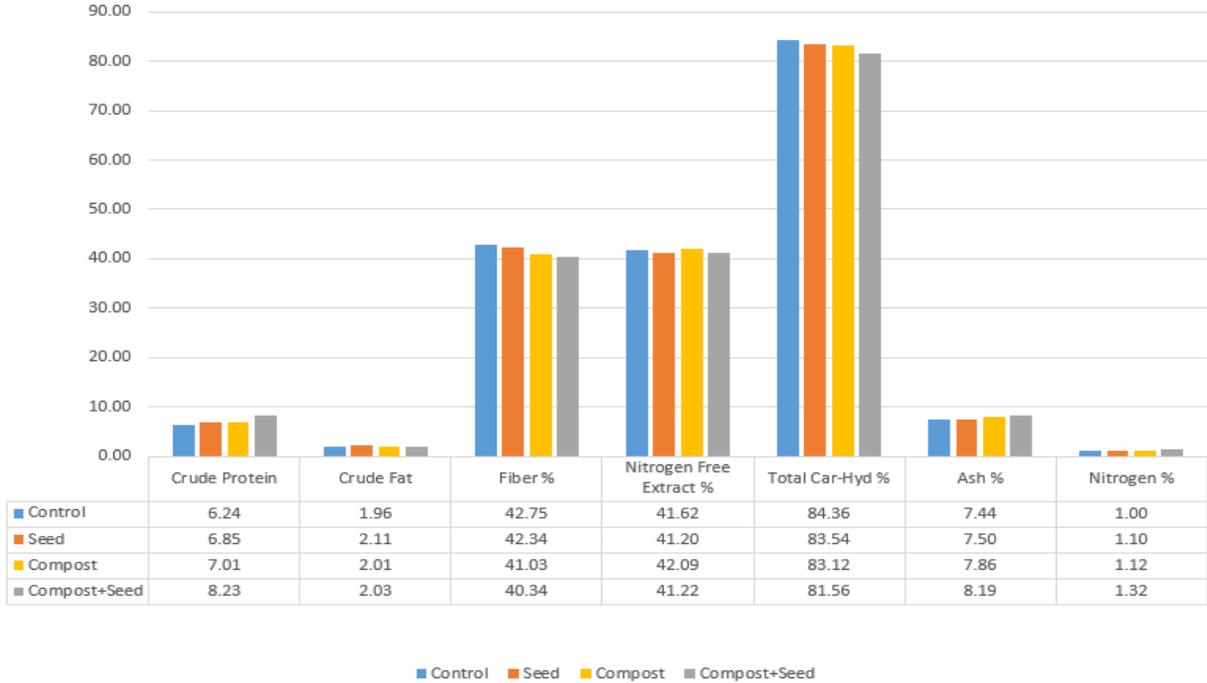
This summer I collected the first year of data from the study and some of the initial finding are very interesting. In terms of forage productivity (this is the total amount of grasses and forbs produced in the spring just as they are starting to brown), we saw an increase in forage across all sites on the plots that received compost. We also saw an increase in forage on the plots that received both compost and seed when compared to the untreated plots.



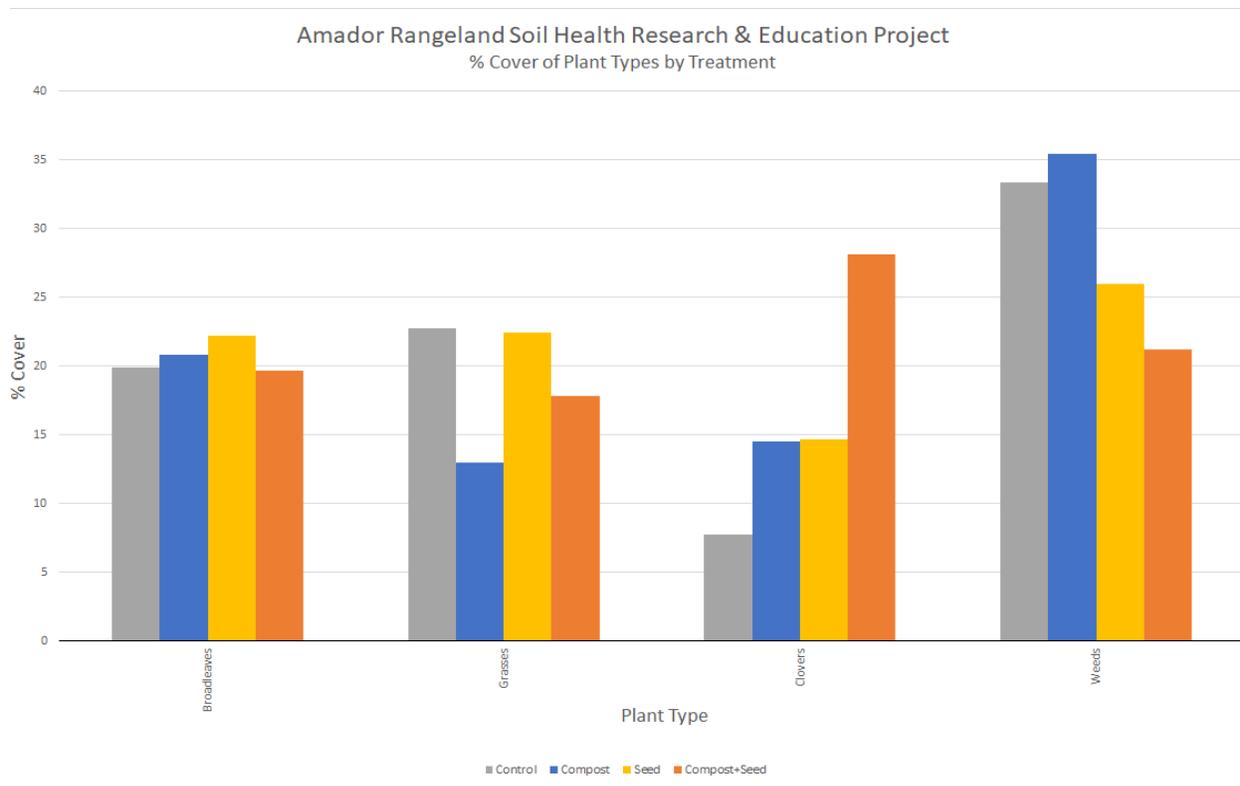


When it came to the quality of the forage produced, we also saw some differences. One of the best indicators of forage quality is crude protein. Across all sites, areas treated with compost and seed had 31% more crude protein than the untreated plots. Also, fiber which is an indicator of low quality was higher in the untreated plots.

### Amador Rangeland Soil Health Research & Education Project Forage Quality 2019/2020 Season



One of the main goals of this project is to examine the effects of compost and/or seeding with a clover mix may have on desirable vegetation and weeds. All five ranches in the study have increasing weed populations including yellow starthistle, medusahead, and barbed goatgrass. To compare the different types of plants at each site, we measured the percent cover of each individual species at each ranch. We then categorized those into four major groups: Broadleaves, Grasses, Clovers and Weeds. For the broadleaf plants, there were no significant changes between treatments. For the desirable grasses, we saw a decrease in the compost treatments as compared to the other treatments. In the clover treatment we saw similar increases in both the compost alone and seed only treatments. Although there was no seed in the compost only treatment, there may be a competitive advantage to legumes in the presence of compost which might contribute to the increase. In the compost plus seed treatment, we saw a significant increase (3 times) in the amount of clovers. Lastly, when it came to weeds, we saw the greatest decrease in weed populations in the compost plus seed treatments.



It is important to point out that this is just one year of data. We will continue to monitor these treatments for a couple of years and send out progress reports on the findings.

A project by the Amador County Resource Conservation District and the University of California Cooperative Extension.