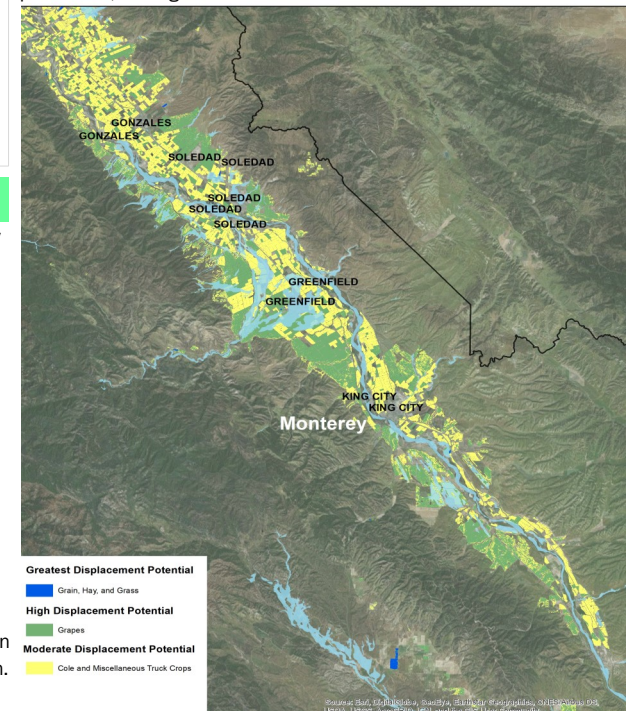


# Closing the Dietary Guidelines Gap: Site Suitability for Expanded Lettuce Production in Monterey County

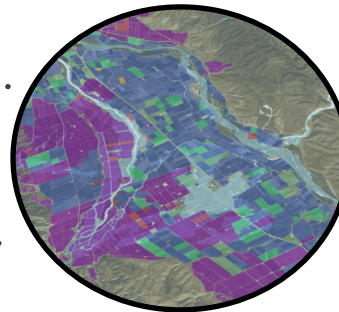
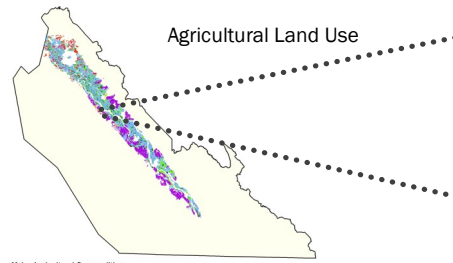
Laura Barley  
Fundamentals of GIS  
December 21, 2017

## Results: Dietary and Economic Trade-Offs

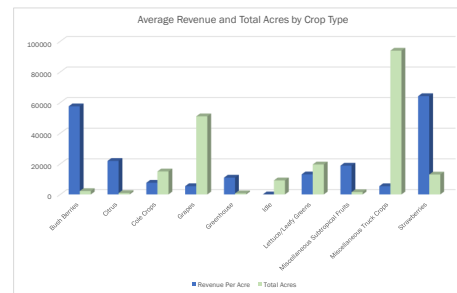
While far more than 12,000 acres bear potential for crop displacement, most land suitable for lettuce production displays only somewhat marginal and tenuous potential. Very little land of low value, like hay or grain, is available for displacement, thus the main options are relegated to vineyards and other vegetable production, displayed in a section of the map above. Grapes typically yielded roughly \$5000 per acre in 2014, while lettuce yielded over \$13,000 per acre—though the monetary incentives for displacement seem simple, it must be acknowledged that vineyards support Monterey County with a larger tourism economy. Cole crops, such as broccoli and cabbage, are also somewhat cost-competitive with lettuce, as are the plethora of other vegetables grown in the county. Lettuce may be able to displace this acreage on price alone, but when considering the framework of the dietary guidelines, these vegetables are equally suitable for meeting nutritional recommendations. Ultimately, this model can be used to further develop a site suitability model specifically tailored towards crop displacement, ideally to include crop revenue, crop water usage, and nutritional improvement, among other factors.



## Monterey County, CA



Crop Land Use by Parcel; predominantly Grapes, Lettuce, and Miscellaneous Vegetables

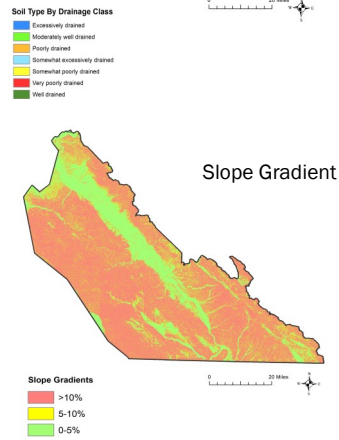
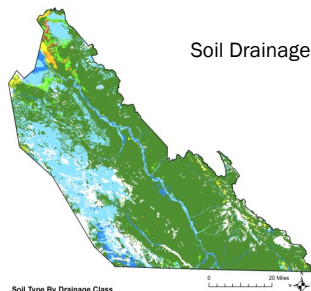


## Methodology: Site Suitability Model

Three main inputs were used to assess site suitability for lettuce production: slope, soil drainage, and average revenue of existing agricultural land, all from the year 2014. For growing and harvesting purposes, lettuce must be grown at a more or less neutral slope (>5%). Lettuce also requires at least moderately drained soils, and thrives in well-drained soils in arid climates. Lastly, because most land suitable for agricultural production in California has already been cultivated, lettuce will likely need to displace existing crops. Many factors can influence crop displacement, but the primary factor of comparative crop revenue per acre was utilized in this model, from Monterey County Crop Report 2014 data. Each data set was ranked if land is relatively flat, well-drained, and currently cultivates crops with lesser annual revenue than lettuce, it is plausible for expanded lettuce production.

## The Imperative for Increased Lettuce Production in Monterey County, CA

The 2015 Dietary Guidelines report that most Americans fail to meet the recommended portions of key food groups, namely dark green vegetables (DGVs). While many dietary patterns must shift to close the gap between currently-consumed and recommended portions of DGVs, progress necessarily includes increased production of crops already proven to be palatable amongst US consumers. Lettuce, one of the most commonly-consumed DGVs, is primarily produced in Monterey County, CA, which features extensive infrastructural investment. According to previous research, over 12,000 additional acres of lettuce must be grown in Monterey County to close the consumption gap. This project explores the feasibility of expanding lettuce production in the intensified agricultural region, considering climatic and economic factors.



- Sources
- USGS National Elevation Dataset, 2013
  - Monterey County Crop Report, 2014
  - NRCS SSURGO Soils Data, ESRI 2014
  - Monterey County Cities, River Basin, LAFCO 2017