

California Population Growth Impact on Agriculture



About Us



Ryanne Tracy

Ryanne Tracy is pursuing a master's degree in Agriculture Education. She is from Victor, MT where she fell in love with agriculture. Growing up she would help her grandpa on the family ranch and would go rodeo on the weekends. She then went to Montana State University and completed her bachelor's of science in Business Marketing. Ryanne then came to Cal Poly to compete on the rodeo team and assistant coach well as obtaining her masters.



Bella Skinner

Bella Skinner is a third year Agricultural Communications major with a minor in Agricultural Education, she plans to graduate in Spring of 2020. She is from the small farm town of Loma Mar, CA where she grew up surrounded by agriculture. This background sparked her passion for the industry and makes her excited for a future in agriculture. She has been involved in the Cal Poly WOW program and volunteers her time at a local goat dairy in Cambria.



Chelsey Bushnell

Chelsey Bushnell, from Red Bluff, California, is a 5th year Master's Student receiving her degree in Agriculture Education. She graduated from Chico State University, then moved to Cal Poly. Chelsey competes on the Cal Poly rodeo team as well as assistant coaches alongside head coach, Ben Londo. Her love for agriculture originated as a young girl competing in rodeos and working on family ranches. Chelsey plans to graduate from Cal Poly in 2019, and continue coaching and working in the agriculture industry. One day she plans to become a teacher.

Table of Contents

Introduction.....	4
California Ag Vision.....	4
Water.....	4-6
Regulations.....	6-7
Land.....	7-9
California Agriculture Future.....	9
Citations.....	10-11

Introduction

California is one of five Mediterranean growing regions on earth. The state plays an important part for the food security in the United States. The world's population is expanding to nine billion people making California's production in high demand. (California Department of Food and Agriculture, 2017) The issue of the rapid population increase is putting pressure on California to produce more while keeping farmers and ranchers profitable. Farmers and ranchers are facing challenges with water, regulations, urbanization infringement on agricultural lands, along with other factors. These challenges can force some farmers and ranchers to sell their operation and trade their land in for subdivisions. From there it goes back to the problem of population growing and less farms to produce our food. Where do we go from here?

California Agricultural Vision

California Agricultural Vision was conceived by the California Department of Food & Agriculture and the State Board of Food and Agriculture to address agricultural challenges in California. The board was chosen through public listening sessions as well as the goals they wanted to obtain for sustainability. The purpose of the California agricultural vision is "to make California a better place to live because of what we grow and how we grow it" (California Department of Food and Agriculture, 2017). The vision was created because California is rapidly growing. The state wants to prevent urbanization occurring in rural areas. They wanted a clear plan on how they are going to keep feeding America while the population increases.

Water

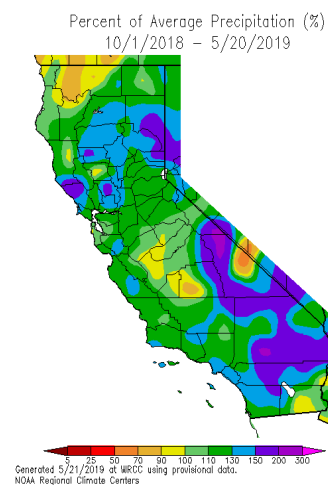
Introduction to water and population

California has been said to be the most hydrologically altered landmass on the planet. (Water Education Foundation, 2018). Once where deserts and grasslands expanded across the state, it now has reservoirs that store water to

create a system to transfer water to needed areas. Wetlands have been converted to farmlands, and swampy lands have been transformed to landfills for urban development. As a result of the state's natural resources, California is the leading agricultural producer, in addition to being the most populated state in the country. California's population has grown by millions the past 40 years. Much of the state's population lives in areas that rely on water that has to be imported. Agriculture in the southern parts of California, are highly dependent on water transported from northern parts of the state.

California accounts for over 13% of the nation's total agriculture value including more than 400 different commodities throughout the state (California Department of Food and Agriculture, 2019). The state alone produces about half of the United States grown vegetables, nuts and fruits. All across the nation, consumers in the United States purchase crops that are produced in California. Many of the products are exported to markets all around the world. California makes more money off of agriculture than any other state. In 2013, California farmers sold roughly \$50 billion worth of food.

However, the rapid development of the state and agriculture success has not been without challenges. There are many issues that make it difficult for farmers and ranchers to have enough water resources year to year. Population growth has affected every aspect in California, and the population is only continuing to grow.



History of water and population

In 1850, California began building an infrastructure to control water to deal with population growth (Water Education Foundation, 2016). It began by forming a levee and reclamation districts along with state water projects following shortly after. Transportation of water has caused conflict and water issues for many years in California due to droughts, availability, regulations, etc. There are two major water development systems in California, these include, the California State Water Project and the Federal Central Valley Project. Both projects capture and store water, which is then redistributed into rivers, levees, and canals across the state. After that, the water generally is moved from Northern California sources, to the San Joaquin Valley and Southern California cities. The water supply in California serves over 30 million people and irrigates over 5,680,000 acres of farmland.

In 1957, the California Water Plan was published. The California Water Plan is the State's plan for sustainably managing and developing water resources for current and future generations. It was first intended for “control, protection, conservation, distribution, and utilization of all the waters of California, to meet present and future needs for all beneficial uses and purposes in all areas of the state to the maximum feasible extent” (The California Water Plan, 1957). As the population is growing, the water plan has to be updated every 5 years to accommodate to the changes.



Issues with water and population

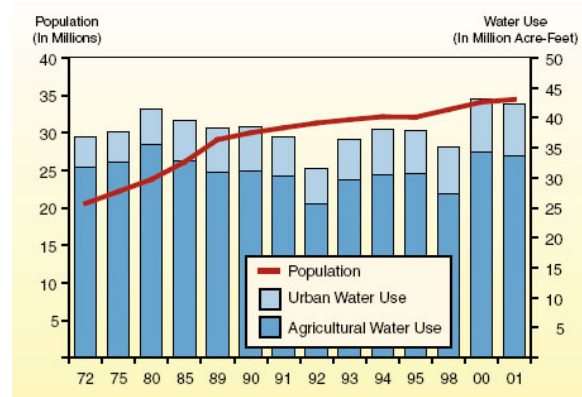
California's population grew by over 10 million between 1980 and 2000, and it is expected to increase by another 14 million by 2030, reaching a total of 48 million. One of the most serious concerns of policymakers is whether the state will be able to supply the water needed to sustain this growth. The old way of doing business by damming up rivers and building aqueducts to move surface water, is no longer a viable strategy for accommodating the increase in population (Water for Growth: California's New Frontier, 2005). Policy makers and water planners have started to consider alternative ways to bring supply and demand into balance over the years ahead. These include expansion of nontraditional sources of supply (for example, underground storage, recycling, and desalination), reallocation through water marketing, and conservation incentives and regulations (Public Policy Institute of California, 2005).

Throughout the years dams and levees have altered natural water patterns, and wetlands have drained rapidly. The northern part of California gets around 100 more inches of precipitation per year than the states southern part of California. This means that around 75 percent of California's available water is in counties north of Sacramento. However, 80 percent of the state's water for urban and agriculture demands are in the southern two thirds of the state (The Washington Post, 2015). Water fuels the economy in California, and managing it efficiently is extremely important. California water supply supports over 35 million people and irrigates over 5.7 million acres of farmland. The state's main role has been to facilitate better water and land-use planning through certain pieces of financial incentives, legislation, and technical support.

Another issue that is constantly being managed is the water discharges from agricultural operations in California, which include irrigation and storm water runoff. These discharges can affect water quality in the state by transporting pollutants, including pesticides, sediment,

nutrients, salts, pathogens, and heavy metals, from cultivated fields into surface waters. Many surface water bodies are affected because of pollutants from agricultural sources. (Food and agriculture organization of the united nations, 2017).

Water quality is vital for the success of agriculture and overall success in California. That means that proper agriculture management is necessary to meet water quality standards. Cooperation between agriculture and domestic water users is necessary to provide adequate water quality for both sides of the spectrum.



Current water and population

Population growth is a huge contributor to water scarcity. Growth in populations means demand and competition for water for domestic, industrial, and agriculture uses. The most water scarce areas are typically those with few water resources, high population densities, and high population growth rates. Population growth limits the amount of water available per person, drives people into marginal regions and also into cities.

On average, 75 percent of California's annual precipitation occurs from November through March. 50 percent occurs from December through February. Our precipitation is dependent on a relatively small number of storms; a few storms more or less during the winter season can determine if the year will be wet or dry (California Department of water resources, 2019).

Past California Governor, Jerry Brown, took the step of forcing urban water agencies to cut back on their water use by close to 25% (The Washington Post, 2015). Cities and towns are now prohibited from using more than three-quarters the amount of water that they used in 2013. This will save an estimate of nearly 500 billion gallons of water. Brown, being a Conservationist, wants to do more, with less.

Farmers and cities have both made steps in reducing their daily water use. The agricultural industry has embraced techniques like sprinkler and drip irrigation. Agriculture not only requires a large amount of water, but it is also one of the most inefficient uses of water. A continuously growing population requires more food. That means more water is needed to produce that food. Agricultural productivity is a vital component of global food security and, therefore, water scarcity and hunger are closely interrelated.

Regulations

History of California Agriculture Regulations

California agriculture has been around since the 1800s. In the 1800s California Agriculture defined them self as America's leading producer. According to *A History of California Agriculture*, between 1890 and 1914 California farm economy shifted to smaller scale operations. The state became very populated causing the farms to shrink in size. The number of farms increased dramatically but the number of acres each farm owned decreased dramatically. Due to all the changes happening to California agriculture, regulations started making noise. Before this time, regulations were not needed as heavily because immigrants were the first to use California's water and they weren't competing against anyone for it. They brought their own workers so labor was never a factor. Lastly, they were the first ones to California so there was no shortage of land. In order to keep up with the change in population, more regulations will be required to preserve aquifers, use water wisely, and limit harmful practices (Alan L, Olmstead, 2017).

Agriculture Regulations

Agriculture regulations are a huge factor in today's farming industry. In the past you could farm where you wanted and how you wanted. Today, there are so many regulations that tell farmers how to farm. For example, California lawmakers passed the Sustainable Groundwater Management Act (SGMA), this regulates how much water farmers can pump from underground sources on their own land. This has impacted farmers because it caused some of them to change to flood irrigation in efforts to save water. The other percent of farmers who didn't change their irrigation plan were forced to sell their land.

Money is a huge factor with regulations today. If farmers can't afford to change the way they do things to comply with regulations, one of two things will happen: they keep farming the way they always have and eventually get a huge fine for not complying, or they can't comply with the regulations right away and have to sell immediately. If they choose to keep farming with their original methods, the fine will be too much for their operation and they will be forced to sell. However, when farms and ranches are sold the rural land becomes urbanized and falls back to the problem of America becoming overpopulated and farmland decreasing (California Department of Food and Agriculture, 2017).

Government regulations cover everything from environmental quality and farm labor standards to food safety. The regulations are to protect our health, the environment and those who work in the fields. Farmers that cooperate with the regulations show improvement in all of these areas. Although farmers who do not comply with the regulations get fined and are having to sell their farm because they can not pay the fine and remain sustainable. The annual cost of California producers are roughly \$2.2 million of the states total market value of the state's agricultural production. The California Agriculture Vision objectives are to reduce regulation conflict, promote cost effective innovation in achieving the objectives of the regulations, greater accountability of regulators

for fair and even treatment of the regulated as well as to the public (California Department of Food and Agriculture, 2017).

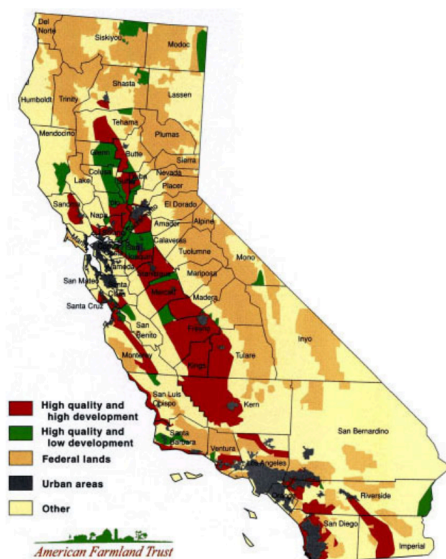
Land

Agriculture has been a staple in California's history since its very existence. Much of the most populated cities in California now, originally were booming agriculture counties, supplying food for the entire United States. Los Angeles County, which now has a population of over 10 million, used to be the number one agriculture county in the entire United States for four decades. Starting in 1909 Los Angeles County became an agricultural powerhouse with a multitude of various crops and livestock being produced, however in 1949 urbanization in Los Angeles began to spread, taking over agriculture land to be developed (Gerber, 2019). As Los Angeles County became less prevalent in agriculture, farms and ranches began to move into the Central Valley to take advantage of the open landscape and rich soils. While agriculture moved to the Central Valley, the amount of land in agricultural use began to drop in 1954, creating a negative relationship between increasing population and farmland acres (Medvitz, 1995). According to the *Census of Agriculture*, in 1992 California had about 28.9 million acres of total farmland and about 7.5 million acres of irrigated land, representing decreases of 23.5% and 11.0% from the peak years for these acreages, 1954 and (Medvitz, 1995).

Now

California continues to be the leading state in Agriculture production in the United States, despite the ever-decreasing amount of agricultural acreage. Of the 100 million acres of land in California, only 43 million acres are used for agriculture. Of the agriculture land, 16 million acres are grazing land and 27 million acres are cropland (Thompson, 2009). California's agriculture lands continue to be threatened as the population increases and more housing and development is needed. Around 3.4 million acres in California's agriculture counties

are now urbanized, another 2 million acres are so urbanized that there is no more agriculture at all (Thompson, 2009). Urbanization of land is such a threat for agriculture because agriculture land is typically on level land near a water source, the same qualities that make for easy development. Due to this similarity in resources, Urban lands currently comprise 5.3 million acres, about 5% of the total area of the state. Of this, nearly 85% of urbanized land was converted from what was originally rangeland (Brown, 2017). The problem of the loss of agriculture land for development is ever increasing. Since 1990, urban development has consumed an acre of land for every 9.4 people statewide (Thompson, 2009).



Future

The loss of agricultural land for development and urbanization due to the increasing population is already causing problems for farmers and ranchers, but will only worsen as this pattern continues. If current development trends continue, 1.3 million acres of California agricultural land, including 670,000 acres of prime, unique and statewide important farmland, will be developed by 2050. For irrigated cropland alone, this would entail an annual loss of an estimated \$2 billion in agricultural production in current farm gate dollars (Thompson, 2009). The continual rise in

California population increases the pressure on farmers and ranchers to provide more food while cutting back on the resources needed to produce this food. If actions are not taken soon, California, the leading state in agriculture production, will not be able to produce the necessary amount to continue to be self-sustaining.

Table 6.2: Top 10 Counties with Forest and Rangeland Most Threatened by Projected Development (to 2060), Ranked by Total Area and Percentage of Remaining Developable Land

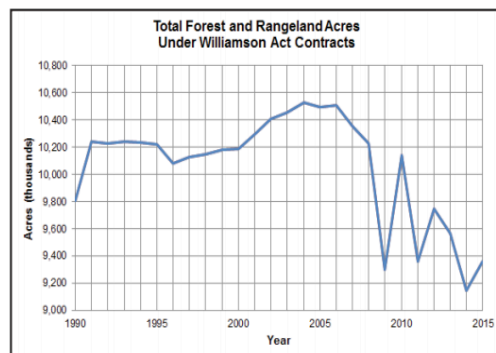
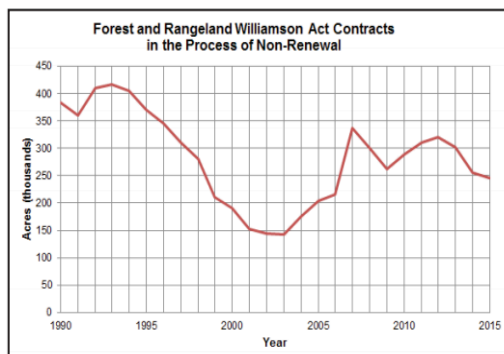
County	Overall Rank	Acres Per Year	Percent of Available
San Diego	1	5,782	13.5%
Los Angeles	2	5,648	17.3%
Kern	3	7,472	9.8%
Riverside	4	6,455	8.9%
Sonoma	5	2,628	16.0%
Yuba	6	1,114	20.3%
Sacramento	7	1,029	25.5%
San Bernardino	8	9,472	3.9%
Placer	9	1,637	10.9%
Contra Costa	10	1,115	20.6%

Data Source: [33] Spero, J. and R.E. Walker, 2017.

Solution

Given the current status of urbanization of agriculture land, and the projected future of a continually increasing population in California, it is evident that a solution must be found to protect agriculture land and improve production rates. While there are some current efforts being made to protect agriculture land, it is not enough to make a significant impact. Agriculture lands under the California Land Conservation Act, also known as the Williamson Act (WA), offers lower property tax assessments in return for an annually renewed 10-year agreement not to develop or subdivide, encouraging the preservation of farmland (Brown, 2017). While this is a step in the right direction, this does not apply to all agriculture land and can be ineffective if someone is willing to pay the extra property tax amount. If more regulations are made to monitor the amount of agriculture land that can be developed on, a significant amount of agriculture can be preserved. Proposition 70 of 1988 provided state bond funding to a number of land trusts throughout the state for these programs. However, while some land trusts, such as those in Marin, Sonoma and Napa counties, have been successful in protecting

locally important agricultural areas, land trusts to date have had only a minor impact on statewide farmland conversion. Well below 1% of California land is in public or private land trusts, and a small fraction of that is agricultural land (Sanders, 1998). If there was a 28% reduction of annual development in the Central Valley, it would preserve 9,000 agricultural acres a year. In addition to making efforts to preserve land, growers and ranchers can continue to make more productive use per acre of a decreasing farmland base, while cities and other urbanizing communities can consume smaller amounts of land by increasing their population densities and infill development (Medvitz, 1995).



California Agriculture Future

According to a report from the Food and Agriculture Organization of the United Nations, looking into the future, there are two big drivers in America, food demand and population growth. In 2050 the world's population is projected to reach 9.1 billion people. That means farmers must increase food production by 70 percent. With population growing and land decreasing there is one solution. Farm consolidation and advanced technology to keep them going. Farms will consolidate due to people selling and population growth and advanced technology will cause the labor problem to no longer be an issue. The machinery that will be created will eliminate the amount of labor workers needed on farms and ranches. It will create jobs in the data analysis field. High technology equipment will mean that a lot of data will need to be taken to make sure the machines are producing like people were. The problem with high technology equipment like robots is regulations. (David Widmar, Purdue University, 2017) They are already working on creating machines that will regulate soil moisture. You will be able to track it on your smartphone. When you see the soil moisture is low then you will add water. This will help save water. There is a piece of technology being tested right now called the LettuceBot. It uses processors, cameras, computers and quarter-inch sprayers to thin lettuce plans. This kind of technology will result in less chemical use and lower environmental impact. Needless to say, even though it is very scary to think that farms are decreasing and population is growing, young farmers and ranchers are using modern day technology to enhance farming and ranching in the future. California has a plan between the California Ag Vision and the progression of technology to keep the state the #1 feeder in America (Syngenta, 2017).

Citations

- Brown, E. G., Laird, J., & Pimlott, K. (n.d.). *California's Forests and Rangelands: 2017 Assesment* (pp. 145-164, Rep.). CA: California's Department of Forestry and Fire Protection. doi:<https://frap.fire.ca.gov/assessment2017/FinalAssessment2017/Chapter6-PopulationGrowth.pdf>
- California Department of Food and Agriculture. (n.d.). California Department of Food and Agriculture. Retrieved May 15, 2019, from <https://www.cdfa.ca.gov/agvision/>
- California Department of Food and Agriculture. (n.d.). California Department of Food and Agriculture. Retrieved from <https://www.cdfa.ca.gov/Regulations.html>
- Gerber, J., & Surls, R. (2019, March 01). Los Angeles County's Forgotten Farming History. Retrieved May 6, 2019, from <https://www.pbssocal.org/kcet-originals/los-angeles-county-was-once-the-top-agricultural-county-in-the-nation/>
- Gray, N. June 2018 “California Water Timeline.” *Water Education Foundation*, 2018, www.watereducation.org/aquapedia/california-water-timeline.
- Guo, J. 3 Apr. 2015. “Agriculture Is 80 Percent of Water Use in California. Why Aren't Farmers Being Forced to Cut Back?” *The Washington Post*, WP Company, www.washingtonpost.com/blogs/govbeat/wp/2015/04/03/agriculture-is-80-percent-of-water-use-in-california-why-arent-farmers-being-forced-to-cut-back/?noredirect=on&utm_term=.94f5995ceed4.
- K, Goodwin J. The California Water Plan, 1957. State of california department of Water resources division of resource planning. <https://water.ca.gov/LegacyFiles/waterplan/docs/previous/californiawaterp03cali.pdf>
- Mateo-Sagasta, J. 2017 Food and agriculture organization of the united nations, 2017. A global Water quality crisis and the role of agriculture. <http://www.fao.org/3/a-i7754e.pdf>
- Medvitz A, Sokolow A. 1995. Can we stop farmland losses? Population growth threatens agriculture, open space. *Calif Agr* 49(6):11-17. <https://doi.org/10.3733/ca.v049n06p11>.
- Nemeth, K. California, State of. “Current Conditions.” 2019, water.ca.gov/News/Current-Conditions
- Noonan, K. (2017, July 14). When the San Fernando Valley Was Rural. Retrieved May 10, 2019, From <https://www.kcet.org/shows/lost-la/before-suburbia-agriculture-dominated-the-san-fernando-valley>

Citations Cont.

- Olmstead, A. L., & Rhoad, P. W. (2017). A History of California Agriculture. 1-24.
doi:https://s.giannini.ucop.edu/uploads/giannini_public/19/41/194166a6-cfde-4013-ae55-3e8df86d44d0/a_history_of_california_agriculture.pdf
- Sanders S. 1998. Perspective: Statewide farmland protection is fragmented, limited. Calif Agr 52(3):5-11.<https://doi.org/10.3733/ca.v052n03p5>.
- Syngenta. (n.d.). Trending 2050: The Future of Farming. Retrieved May 20, 2019, from <http://www.syngenta-us.com/thrive/research/future-of-farming.html>
- Thompson, E. (2009, July). Agricultural Land Loss & Conservation. Retrieved May 6, 2019, from http://www.cdfa.ca.gov/agvision/docs/agricultural_loss_and_conservation.pdf



Our group researched the impacts of California population increases on Agriculture over the last two months. We learned a lot about the California Ag vision, and how an ever increasing population impacts agriculture land, water, and regulations. We hope to educate members of society on the importance of sustaining our agriculture lands. Thank you for taking the time to read our research.