AGRICULTURE STUDY

LEAGUE of WOMEN VOTERS of SAN DIEGO COUNTY
2015

AGRICULTURE STUDY

League of Women Voters of San Diego County
2015

The League of Women Voters of San Diego County, also known as the County Inter-League Organization (ILO), is directed by a Board of elected and appointed officers. The ILO is comprised of the members of the two local Leagues in the county, who are represented on the Board by their Presidents. The County League program primarily addresses regional public policy issues.

The Study Committee

Margaret Dornish, Chair	North County San Diego LWV
Kathy Anderson	North County San Diego LWV
Mary Hanson	San Diego LWV
Diane Mochizuki	North County San Diego LWV
Anita Reith	San Diego LWV
Roni Seay	North County San Diego LWV
Nancy Telford	North County San Diego LWV
Nan Valerio	San Diego LWV

CONTENTS

INTRODUCTION

San Diego County has the 12th largest farm economy among the nation's more than 3,000 counties. San Diego County has more small farms, defined as fewer than 10 acres, than any other county. It ranks second in the number of farms with women as the principal operator. It is the leading producer of both nursery crops and avocados, although avocado production is diminishing. Ornamental trees and shrubs account for 23% of the total value of agricultural production in the County. Indoor flowering and foliage plants, together, is the highest value crop, valued at $457,000 per acre, or 18% of the total crop value.

The County of San Diego has always been at the forefront of organic farming, with the 347 growers who are registered as "organic" producing over 150 different crops on 6,700 acres. Most of the fruits and vegetables grown locally are of such high quality that they are used for fresh produce rather than being processed, canned or frozen. No genetically modified organism (GMO) crops are raised in San Diego County, and pesticide use is low.

HISTORY OF AGRICULTURE IN SAN DIEGO COUNTY

Following the European settlement, the most important agricultural commodity was range cattle, which were raised primarily for hides and tallow rather than meat. Availability of water limited early success in growing crops. However, in 1807, using Indian labor, a dam was built on the San Diego River at the head of Mission Gorge, and a six mile long flume transported the water to the San Diego Mission, enhancing the production from vineyards and orchards at that settlement.

Before Prohibition (1919-1933), San Diego was a leading wine producer. The growing of wine grapes is believed to have begun around 1781 at the Mission. Later, another liquid food became important, and Mission Valley became the center of the local dairy industry. The first commercially successful dairy farm began in the 1880's, and by 1920 there were 20 dairy farms in Mission Valley alone. By the 1950's dairy was the County's third most important agricultural product. When the City of San Diego rezoned Mission Valley to allow commercial uses, dairy farms were replaced with office buildings, condos and shopping centers.

ROLE OF GOVERNMENT

The commercial agricultural industry in San Diego County is affected by all levels of government. The California Farm Bureau Federation and its member agency, the San Diego Farm Bureau, are non-profit organizations that help farmers deal with and understand the various regulations, restrictions and obligations required by various government entities. These government agencies include the following:

Federal: The U.S. Department of Agriculture (USDA), Immigration and Customs Enforcement Agency (ICE) and others regulate farm aid, employment, international trade, transportation, worker and food safety, and many other domains that affect farming.

State: The State of California has regulatory programs related to pesticide application, prevention of pests and diseases, farm labor, housing, food safety, animal health, marketing, inspections, monitoring of water runoff and much more. It also helps provide research about best farming techniques, new pesticide and insecticide testing, and pest and disease sources and abatement through the University of California Extension system.

Regional Water Quality Control Board (RWQCB): This State agency requires all agriculture and nursery operations to sample wet and dry weather runoff for pollutants and report the results to the Board.

County: The County of San Diego administers weights and measures regulation, economic research on local agriculture, County Home and Farm Advisors, and detector dogs. It also educates the public about prevention of pest and disease importation into the county from other states and countries.

The General Plan for San Diego County, updated in August 2011 by the County Board of Supervisors, recognizes agriculture as an important land use. Preserving the County's rural atmosphere, protecting land with physical or environmental constraints or hazards, preserving open space, farmland and natural resources and preventing urban sprawl are all promoted by maintaining semi-rural and rural classifications. The County does not have a specific land use designation exclusively for agriculture. However, the General Plan's Conservation and Open Space Element includes a category for Agricultural Resources that calls for minimizing land use conflicts, preserving agricultural resources, and supporting the long-term presence and viability of the agricultural industry as an important component of the region's economy and open space linkage.

To incentivize the goals in the General Plan, the County of San Diego has initiated an agricultural conservation program known as the Purchase of Agricultural Conservation Easement (PACE) Program. Willing agricultural property owners are compensated for placing a perpetual easement on their agricultural property that limits future uses and removes future development potential. As a result, the agricultural land is preserved and the property owner receives compensation that can make its continued use for agriculture more viable.

San Diego County Water Authority (SDCWA): The SDCWA is an independent agency that wholesales imported and locally sourced water to the county's 24 water districts. Seventy per cent of County farmers use the local water distributed by water districts under the umbrella of the SDCWA, which determines supply and rates.

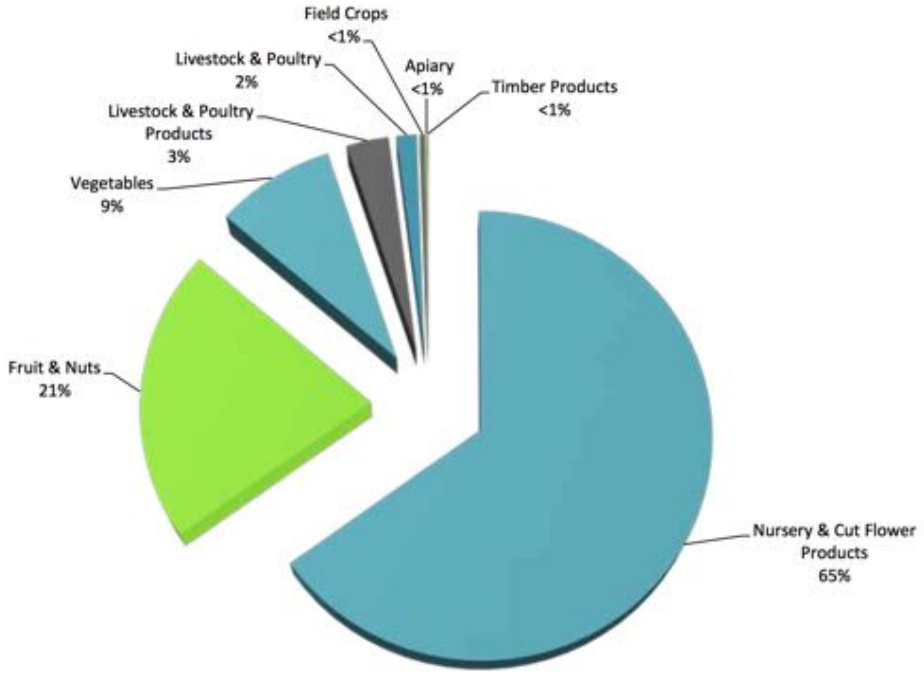
Cities: Farmers within city boundaries are affected by zoning regulations, law enforcement, and farm labor concerns of the local community.

ECONOMICS

San Diego commercial farms produce the highest dollar value per acre of any county in California. In 2013 San Diego County had 5,732 small commercial farms, used 305,573 acres of San Diego County's land, grew more than 200 agricultural commodities, and made $1,850,307,290 from sales.

Although the county's temperate climate is considered ideal for growing a wide variety of crops, only 6% of San Diego County soils are considered excellent in quality. The vast majority of soils are considered poor or very poor. As a result, farm properties are small and farmers grow high-value crops such as nursery plants, fruits and vegetables, which are all somewhat labor intensive.

Agriculture directly provides just over 10,000 jobs in the County, with an average wage of approximately $28,000. The San Diego County Farm Bureau estimates that a total of 30,000 people are supported by the agricultural sector. This includes, in addition to farm workers, those who supply the farms, provide trucks, pipes, farm equipment etc. It also includes those who pack the produce for shipment and/or take it to market, sell it at stands and through Community Supported Agriculture (CSA), which allow direct sales from the farmer to the consumer



From: 2014 San Diego County Crop Report

CHALLENGES

Water:

An adequate, affordable water supply is the greatest challenge facing San Diego farmers. Most use municipal water supplies. Those farmers can participate in the SDCWA's Special Agricultural Water Rate (SAWR) program. Those who voluntarily receive the lower SAWR agree to take less water during supply shortages and emergency situations. SAWR customers experienced a 30% cutback in allotted Agriculture Use water in 2010-2011, resulting in the loss of some citrus and avocado orchards. The SAWR program is important to the agricultural sector, and a new multi-year extension was recently granted by the SDCWA. The biggest SAWR water users are in Valley Center, Rainbow and Fallbrook. In addition to municipal supplies, it is estimated that 9% of the agricultural water supply might come from groundwater.

Unlike the rest of the state, San Diego County agriculture accounts for only 9% of this region's total demand for water. In 2007, agriculture used approximately 99,000 acre feet, but by 2014 consumption had dropped to about 52,000 acre feet. This is explained by several factors, including letting acreage go fallow; for example, there were 17% fewer avocados produced from 2003 to 2013. Farmers are using crops that demand less water and employing more efficient methods of irrigation. Agricultural water use has decreased while the value per acre of the crops has risen, as a result of the growing importance of non-edible horticultural crops in our local agricultural economy.

Climate Change:

Climate change will result in many challenges to the agricultural community, due to increases in temperature and CO2 levels as well as decreases in water availability or predictable precipitation. Lengthening of the growing season introduces asynchrony between timing of flowering and the life cycle of important insect pollinators. Crop yields from locally grown plants could diminish. Temperature increases above 3 to 4 degrees can result in the reduction of plant metabolism rates, most importantly photosynthesis, with a consequential decrease in crop yields. Other possible effects include premature ripening and possible quality reduction for grapes, reduced fruit yield for tomatoes, increased incidence of tip burn for lettuce and similar forms of burn for other crops.

New biotic challenges from weeds, fungi and pests that harm agricultural production can develop in warmer temperatures. Currently, these agents are treated with potentially harmful pesticides, herbicides and fungicides. In addition, beneficial insects (lady bugs, bees, butterflies, etc.) can be harmed by temperature rises, leading to a decrease in their useful activities.

Some of the negative effects of temperature increases can be reduced by the fertilizing effect of increases in atmospheric CO2. However, in higher temperatures, increased evapotranspiration results in higher water loss from the plant, with the resulting need for more water.

Labor:

The availability of labor at crucial times in the growing season is another challenge. The number of farm workers fluctuates between 8,800 in the winter and 10,800 in the summer. There are two categories of farm workers in San Diego County, those who live here and a smaller number of seasonal migrant workers. Migrant workers are a shrinking part of the agricultural labor picture, as farmers turn to non-edible horticultural crops with regular steady workers and fewer peak season demands.

The San Diego Farm Bureau reports that the two immigration proposals to date (2015) do not have a farm labor component, although that component is greatly needed by farmers throughout this country. Lack of federal legislative progress has made it more difficult to find seasonal workers as conditions in Mexico improve and border security has tightened.

Pests and Diseases:

San Diego agriculture faces two serious threats in 2015 from disease carrying pests. The first is Asian Citrus Psyllid (ACP), a carrier of Huanglongbing (HLB), one of the most severe plant diseases in the world. Currently there is no cure, and the ACP pest carries the disease for life. It feeds on new growth citrus leaves. Infected trees produce bitter, hard, misshapen, inedible fruit and eventually die.

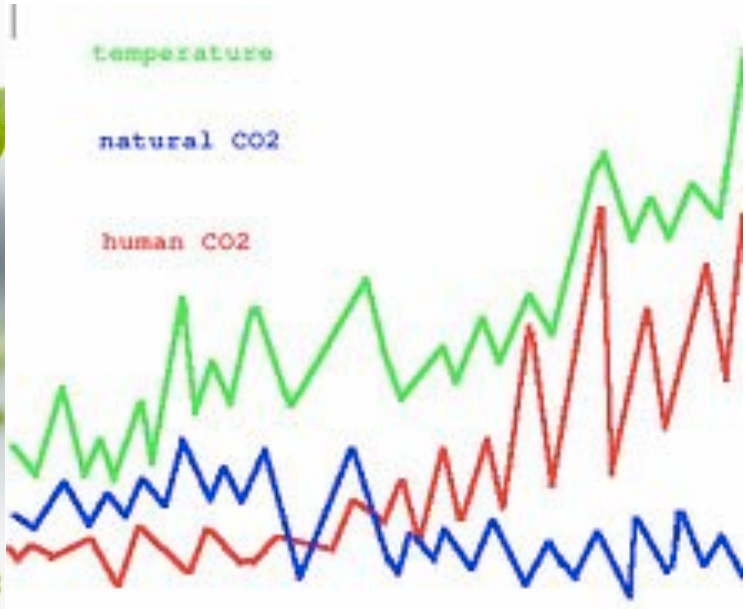
The second threat comes from the Polyphagous Shot Hole Borer. It is widespread in the avocado growing areas of San Diego County. It bores holes in avocado trees and "farms" fungus in the holes. The fungus attacks the tree's vascular tissue, choking off water, causing branch dieback and eventually killing the tree.

Visual inspection at national borders and at nurseries is one way to combat the infiltration of various plant pests and diseases. A unique program provided by the California Department of Food and Agriculture is the California Dog Teams. Highly trained dogs with their handlers visit and inspect by scent packages and mail at USPS, UPS and Fed Ex distribution centers. The dogs "alert" their handlers if they detect any smells that they are trained to associate with specific plant pests and diseases. The program has been effective where it has been used, but currently there are only 13 dogs statewide dedicated to agricultural matters. Two of these dogs are stationed in San Diego. The program receives 2/3 of its funding through the USDA Farm Bill, with the rest coming from other federal appropriations. Locally the San Diego County Department of Agriculture, Weights and Measures is responsible for the dogs and establishes their daily routes.

Another available tool is the Integrated Pest Management (IPM) program, coordinated by the University of California. The broad goals of the IPM program are: 1) increase the use of ecologically based pest management programs; 2) build coalitions and partnerships that link with communities and public agencies; 3) increase predictability and effectiveness of pest management techniques; 4) develop science-based programs that are economically and environmentally sustainable and socially appropriate; 5) protect health and the environment by reducing risks caused by pests and pest management practices. IPM has been shown to reduce pesticide usage.

Pollination:

Many crops rely on bee pollination, and the decline of honeybees from Colony Collapse Disorder, urbanization and a loss of habitat is a global concern. There has not yet been a threat to bee pollination in San Diego County, so the challenge is more one of maintaining a healthy bee population. There are 10 commercial beekeepers locally, and San Diego County ranks third in honey production nationally. Wild bees are also common and important to our local agriculture. Crops on half of all the agricultural land in San Diego County, including avocados and several kinds of vegetables, are pollinated by domesticated and wild bees.



OPPORTUNITIES AND NEW TECHNOLOGIES

Hydroponics:

Hydroponics is one way to meet these challenges. It involves growing plants in a water and nutrient solution, without soil, and can use up to 80% less water than traditional farming. There are additional advantages to hydroponic farming. There is a greatly reduced need for space because plants can be grown vertically and at high density in greenhouses. An acre of hydroponic greenhouses can produce ten times the amount of produce as an acre cultivated by traditional farming methods. Organic hydroponic operations do not use chemicals for pest or weed control. Hydroponic farms can provide locally grown, organic food. The produce moves directly from farm to store, allowing it to ripen on the vine longer, increasing nutrient value and flavor. The hydroponic method works well with tomatoes, strawberries, cucumbers, lettuces, squash, zucchini and peppers. However, hydroponics is constrained by the upfront capital required to create the facility and components as well as the high degree of technical expertise and labor needed to manage the facilities. The definition of hydroponics does not restrict it to only organic. However, because farms get the best return for their dollars for organic produce, there is an incentive to produce it hydroponically in San Diego.

Recycled Water:

Local water reuse is a feasible, reliable and locally controlled source of water. High tech membrane water purification technologies have expanded the current options. Existing and proposed water recycling plants could provide increased water security for the county's agricultural sector. Distribution systems, demand and cost are the major constraints, and range from moderate (reclaimed wastewater) to very high (desalination of ocean water).

Sustainability:

The near term trend of applying more resources, land and water toward high value crops such as ornamentals does create relatively more wealth. However, this shift away from food production also reduces the capacity of our region to provide for its own food needs. Since the 1960's San Diegans have imported almost all of their food from outside the County. This is a cause for concern from the perspective of sustainable and community based agriculture.

CONCLUSION

The significance of commercial agriculture to San Diego County cannot be measured only in dollars. It also provides other physical and social benefits which are irreplaceable. And, happily, it would seem that the negative impacts upon our county are negligible compared to the vast monocultures of farming in the Midwest or the California Central and Imperial Valleys. But preservation of this valuable resource cannot be taken for granted. It is important that voters, decision makers and the entire community appreciate the open space, fresh foods, wildlife corridors, clean air and visual harmony that local agriculture brings to the overall ambience of San Diego County.

RECOMMENDATIONS FOR ACTION

The League of Women Voters of San Diego County believes that the county agricultural industry is of historical, environmental and economic importance to our region. The county possesses unique and separate properties and challenges that differ from the rest of California and the United States. The arid nature of its climate, lack of water sources and high land costs present a special challenge to agriculture in our region.

Land Use

1. Support the preservation and expansion of land used for agricultural purposes through: a) adopted General and Specific Plans; b) zoning; and c) permanent dedication programs in order to encourage the long-term presence and viability of the agricultural industry in an environmentally sound manner.

Challenges to Agriculture in San Diego

Water

2. Encourage farmers to improve water conservation, selection of crops appropriate for our climate and end all runoff of pesticides, insecticides and fertilizers from their fields and groves, as currently recommended by the UC Agriculture and Natural Resources Division (UC ANR). In addition, local governments and water districts, as well as the San Diego County Water Authority (SDCWA) should be encouraged to facilitate ever evolving best agricultural water practices recommended by UC ANR, or similar organizations, through incentives and innovative programs.

3. Support the availability and use of recycled water for a dependable, sustainable source of agricultural water.

4. Monitor the implementation of the 2013 Sustainable Groundwater Management Act goals because groundwater, which may represent 9% of our regional water source, needs to be preserved and protected from contaminants.

5. Continue support of the San Diego County Water Authority (SDCWA) programs and pricing that facilitate the provision of regional agricultural water, when appropriate.

Climate Change

6. Support efforts of the county agricultural industry to adapt to climate change through promotion of research, development of new resources and implementation of environmentally sensitive technologies and conservation strategies.

Pests and Diseases

7. Support government and privately funded efforts to protect the agricultural industry and the environment from pests and diseases. Such programs include the University of California Integrated Pest Management (IPM) Program and the California Detector Dog Teams.

Pollinator Protection

8. Support efforts to protect, maintain and foster a sustainable, healthy population of bees and other pollinators to support county agriculture.

Labor

9. Support immigration policies at the local, state and federal levels which allow for a legal labor force to work in local agriculture.

Opportunities

10. Support new alternative water use farming practices and technologies which result in long term, sustainable, efficient water use.

11. Support research on, and implementation of, sustainable agricultural practices at all levels including production, processing, distribution, consumption and waste management.

12. Support an understanding and awareness of the concept and value of sustainable agriculture both within the agricultural community and among the public.

BIBLIOGRAPHY

SPECIAL ACKNOWLEDGEMENT

We want to especially note the valuable and informative annual publication of the San Diego County Department of Agriculture/Weights and Measures, the "2013 Crop Statistics & Annual Report". It was a crucial foundation to our understanding of the current state of agriculture in San Diego County.

INTERVIEWS

James Bethke, County Director, Nursery & Floriculture Advisor, UC Cooperative Extension

Tim Bombardier, Senior Water Resources Specialist, San Diego County Water Authority

Ha Dang, Agricultural Commissioner / Sealer of Weights and Measures, County of San Diego

Dana Friehauf, Planning Manager Water Resources, San Diego County Water Authority

Eric Larson, Executive Director, San Diego County Farm Bureau

Marilyn Tylke, Land Use and Environmental Planner, County of San Diego (information exchanged by email)

AGRICULTURE WORKERS

Employment Development Department, State of California, San Diego County Industry Employment & Labor Force by month 3/2014 Benchmark http://www.labormarketinfo.edd.ca.gov/data/employment-by-industry.html http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localAreaProfileQSResults.asp?selectedarea=San+Diego+County&selectedindex=37&menuChoice=localAreaPro&state=true&geogArea=0604000073&countyName=&submit1=View+Local+Area+Profile

Farm and Home Advisor, San Diego County http://cesandiego.ucanr.edu

San Diego County Farm Bureau, personal communication from Eric Larson, Executive Director eric@sdfarmbureau.org

San Diego County Adopted Operational Plan Fiscal Years 2014-15 and 2015-16 http://www.sandiegocounty.gov/auditor/opplan/adoptedlist.html

San Diego County General Plan – Housing Element Background Report, pp 23, 23. http://www.sandiegocounty.gov/content/dam/sdc/pds/advance/HousingElementUpdate/Background_Report_final.pdf

San Diego County General Plan Update EIR, August 2011
http://www.sandiegocounty.gov/content/dam/sdc/pds/gpupdate/docs/BOS_Aug2011/EIR/FEIR_2.02_-_Agriculture_2011.pdf

San Diego County Water Authority, sdcwa.org/annualreport/2014

USDA, 2012 Census of Agriculture, Table 7 – County Data, National Agricultural Statistics Service https://www.agcensus.usda.gov/Publications/2012/

US Department of Agriculture, Economic Research Service www.ers.usda.gov/farm-economy/farm-labor/background.aspx

Wikipedia – Farmworker https://en.wikipedia.org/wiki/Farmworker

ECONOMICS

The National University System Institute for Policy Research Economic Ledger Report: Recent Revision of San Diego GDP Show Uneasy Economic Recovery Continues,Nov. 2013 (based on data from the U.S. Bureau of Economic Analysis). http://www.nusinstitute.org/assets/resources/pageResources/Economic_Ledger_GDP_Nov2013.pdfhttp://www.nusinstitute.org/assets/resources/pageResources/Economic_Ledger_GDP_Nov2013.pdf

SANDAG info, December 2012 Traded Industry Clusters in the San Diego Region - High dollar value of all fruits and vegetables. http://docplayer.net/1988890-Info-traded-industry-clusters-in-the-san-diego-region-sandag-december-2012.htm

San Diego County Department of Agriculture/Weight and Measures Crop Report, 2014
http://www.sandiegocounty.gov/content/dam/sdc/awm/docs/Crop Report-Final.pdf

San Diego Foundation 2050 Report http://www.sandiego.edu/2050/
http://www.sandiegocounty.gov/content/dam/sdc/awm/docs/Crop Report-Final.pdf

CLIMATE CHANGE

Cayan, D. et al (2006) Scenarios of Climate Change in California: On Overview. White Paper Report from: California Climate Change Center
http://www.energy.ca.gov/2005publications/CEC-500-2005-186/CEC-500-2005-186-SF.PDF

United States Environmental Protection Agency (EPA) (2013) Climate Impacts on Agriculture and Food Supply http://www.epa.gov/climatechange/impacts-adaptation/agriculture.html

Friend, A.D., et al (2014) Carbon residence time dominates uncertainty in terrestrial vegetation response to future climate and atmospheric CO_2. PNAS 111(9), 3280-3285.

Rosenzweig, C, et al (2014) Assessing agricultural risks of climate change in the 21st century in a global gridded crop model intercomparison. PNAS 111(9) 3268-3273.

L.Hartwell, Allen, Jr, et al. (1993) 4. The CO_2 fertilization effect: higher carbohydrate production and retention as biomass and seed yield. Food and Agriculture Organization of the United Nations http://www.fao.org/docrep/w5183e/w5183e06.htm#TopOfPage

Van de Geijn, S and Goudriaan, J. (1993) 5. The effects of elevated CO_2 and temperature change on transpiration and crop water use. Food and Agriculture Organization of the United Nations http://www.fao.org/docrep/w5183e/w5183e07.htm#TopOfPage

The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States. (2008) U.S. Climate Change Science Program. Synthesis and Assessment Product 4.5
http://www.usda.gov/oce/climate_change/SAP4_3/CCSPFinalReport.pdf

Walthall, C.L., 2012. *Climate Change and Agriculture in the United States: Effects and Adaptation*. USDA Technical Bulletin 1935. Washington, DC. 186 pages
http://www.usda.gov/oce/climate_change/effects_2012/CC%20and%20Agriculture%20Report%20(02-04-2013)b.pdf

Wikipedia – Climate Change https://en.wikipedia.org/wiki/Climate_change

HISTORY OF AGRICULTURE IN SAN DIEGO COUNTY

240 Years of Ranching -- "Historical Research, Field Surveys, Oral Interviews, Significant Criteria and Management Recommendations for Ranching Districts and Sites in the San Diego Region" www.sohosandiego.org/warners/images/240yearsofranching.pdf

San Diego Native Plants in the 1830's by Thomas Coulter and Thomas Nuttall
www.sandiegoflora.com/1830sSDCNP.pdf

Union Tribune story from May 31, 2008, "Before malls, cows rule Mission Valley," by Richard Crawford.
www.sandiegouniontribune.com/uniontrib/20080531/news_1cz31history.html

Journal of San Diego History www.sandiegohistory/org/journal
Summer 1999, article on San Diego agriculture.
Summer 1974 article on agriculture before European settlement.
Fall 1978 article about the Japanese in San Diego.
Winter 1975 article, "Merchants and Dons."
Spring 1971 article, Role of the San Diego River in the development of Mission Valley
Paper by William Smyth on San Diego history from 1542 to 1908

National Park Service article, Old Mission Dam, San Diego
https://www.nps.gov/nr/travel/american_latino_heritage/Old_Mission_Dam.html

San Diego County Farm Bureau website - History section
https://www.sdfarmbureau.org/AboutUs/Farm-Bureau-History.php

San Diego Tourist Authority, "A History of Winemaking in Southern California" from August 2011 www.sandiego.org/members/wineries/milagro-farm-vineyards-and0winery/articles/a-history-of-winemaking-in-southern-california.aspx#JSDzZLy3vwDOKWXP.97

Wine Institute of California and San Diego County Vintners Association
sandiegowineries.org/

PESTS AND DISEASES

Detector Dog Program, San Diego County Department of Agriculture/Weights and Measures https://www.cdfa.ca.gov/plant/dogteams/news.html

San Diego County Farm Bureau, personal communication from Eric Larson, Executive Director eric@sdfarmbureau.org

State of California Department of Food and Agriculture https://www.cdfa.ca.gov

State of California Department of Pesticide Regulation http://www.cdpr.ca.gov

University of California, Agriculture and Natural Resources,
http://www.cesandiego.ucdavis.edu

POLLINATION

San Diego County Department of Agriculture/Weights and Measures
http://www.sandiegocounty.gov/content/dam/sdc/awm/docs/Crop Report-Final.pdf

State of California Department of Food and Agriculture https://www.cdfa.ca.gov

State of California Department of Pesticide Regulation http://www.cdpr.ca.gov

Effects of neonicotinoids on Bees
inhttp://journals.plos.org/plosone/article?id=10.1371/journal.pone.0029268

http://blog.ucsusa.org/doug-gurian-sherman/genetically-engineered-crops-in-the-real-world-bt-corn-insecticide-use-and-honeybees-2?

“The Fall and Rise of the Honey Bee”, Peter Loring Borst http://slideplayer.com/slide/4402987

“The Plight of the Honeybee”, Bryan Walsh, Time Magazine, August 19, 2013

SAN DIEGO COUNTY AGRICULTURAL LAND USE

County of San Diego Board of Supervisors, Wednesday, December 4, 2013, Minute Order No. 3: Purchase of Agriculture Conservation Easement (PACE) Program http://www.sandiegocounty.gov/content/dam/sdc/pds/advance/PACE/pacebosminuteorder120413.pdf

County of San Diego Planning and Development Services, General Plan, Adopted August 3, 2011: Chapter 3: Land Use Framework; Chapter 5: Conservation and Open Space (COS) Element and COS Goals: County of San Diego, Planning and Development Services, September 2014, http://www.sandiegocounty.gov/content/dam/sdc/pds/gpupdate/docs/GP/LandUseElement.pdf and http://www.sandiegocounty.gov/content/dam/sdc/pds/gpupdate/docs/GP/ConservationandOpenSpace.pdf

Purchase of Agriculture Conservation Easement (PACE) Program Guidelines http://www.sandiegocounty.gov/pds/advance/PACE.html

SAN DIEGO COUNTY WATER USAGE

San Diego Water Authority 2014-15 Annual Report http://sdcwa.org/annualreport/2015/