



HEALTHY SOILS = HEALTHY LIVES

CAT-PHWG | 2-7-18

Amrith (Ami) Gunasekara
Science Advisor to the Secretary
Manager, Office of Environmental Farming and
Innovation



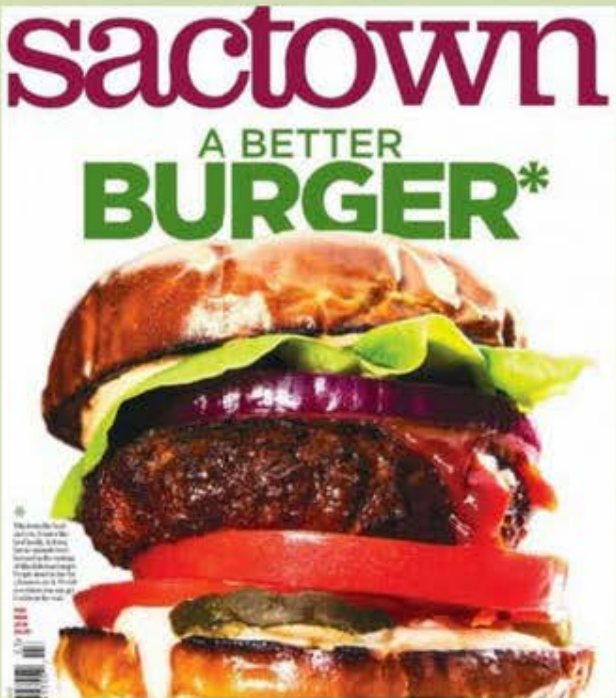
Nutrition



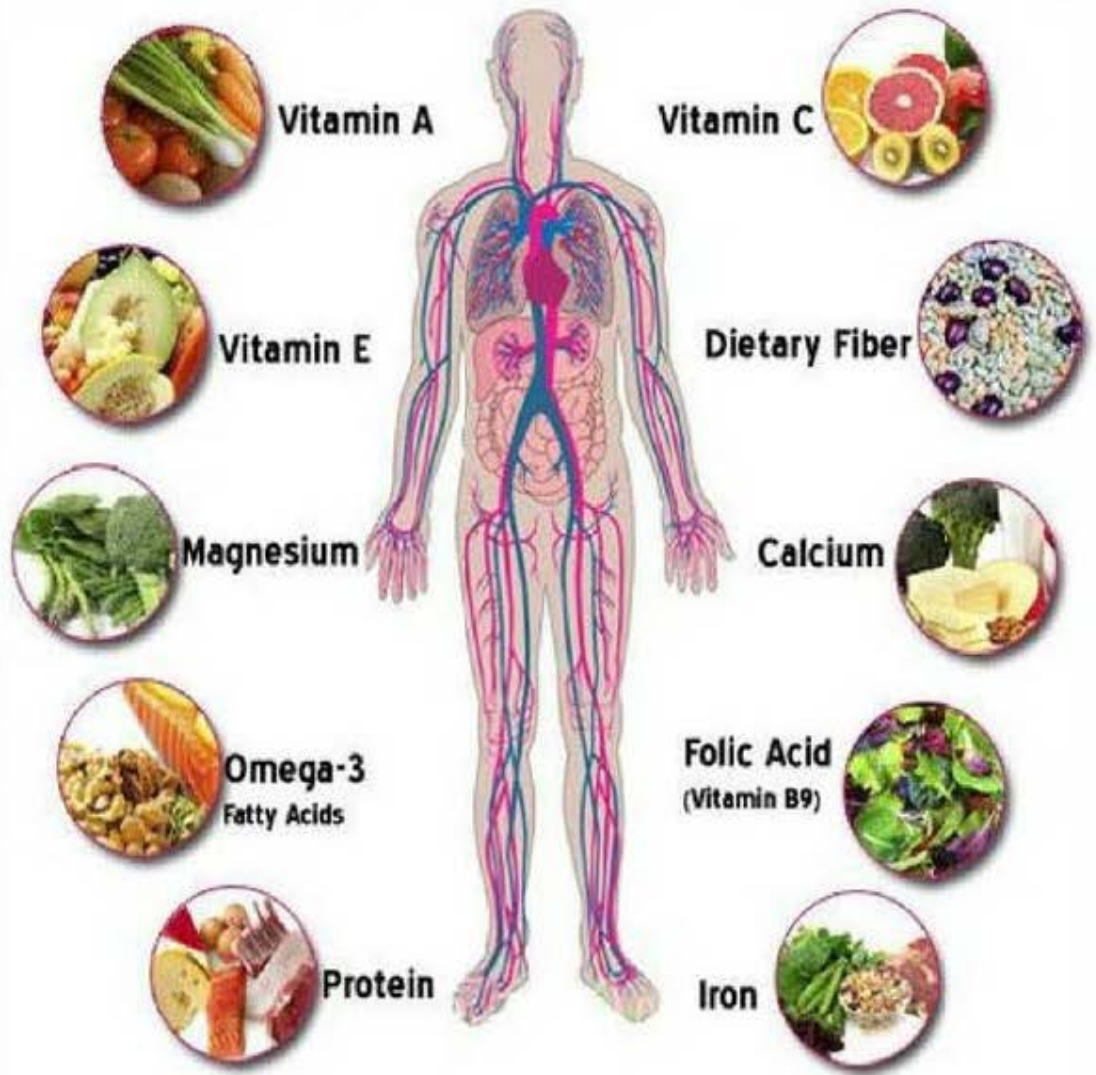
Climate Change



Biodiversity



ESSENTIAL NUTRIENTS FOR YOUR BODY



USDA Food Pyramid

Fats, Oils & Sweets

USE SPARINGLY

Milk, Yogurt & Cheese Group

2-3 SERVINGS

Vegetable Group

3-5 SERVINGS

Key

- Fat (naturally occurring and added)
- Sugars (added)

These symbols show fats and added sugars in foods

Meat, Poultry, Fish, Dry Beans, Eggs & Nuts Group

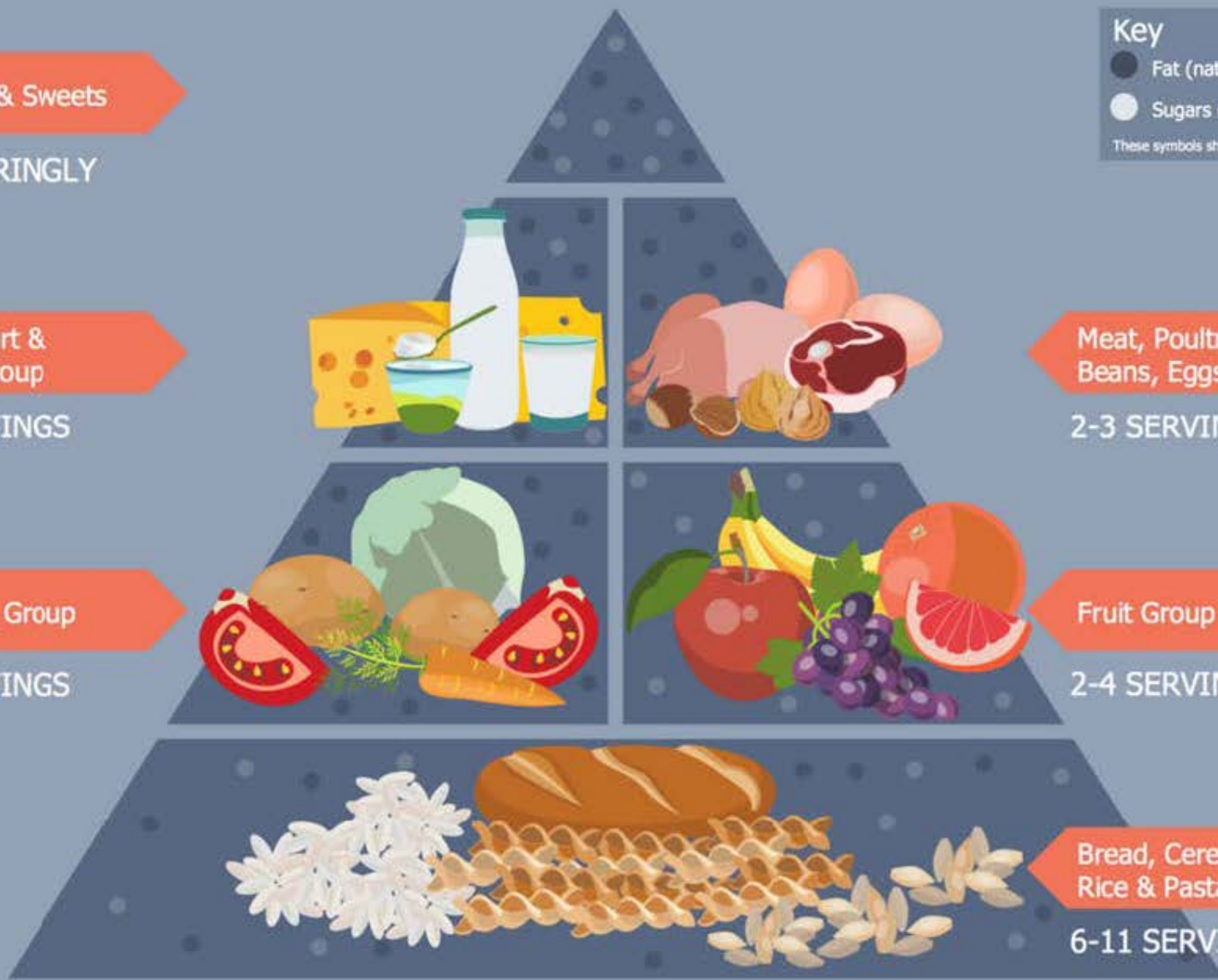
2-3 SERVINGS

Fruit Group

2-4 SERVINGS

Bread, Cereal, Rice & Pasta Group

6-11 SERVINGS



CA AG FACTS

25%

of the state is farmland

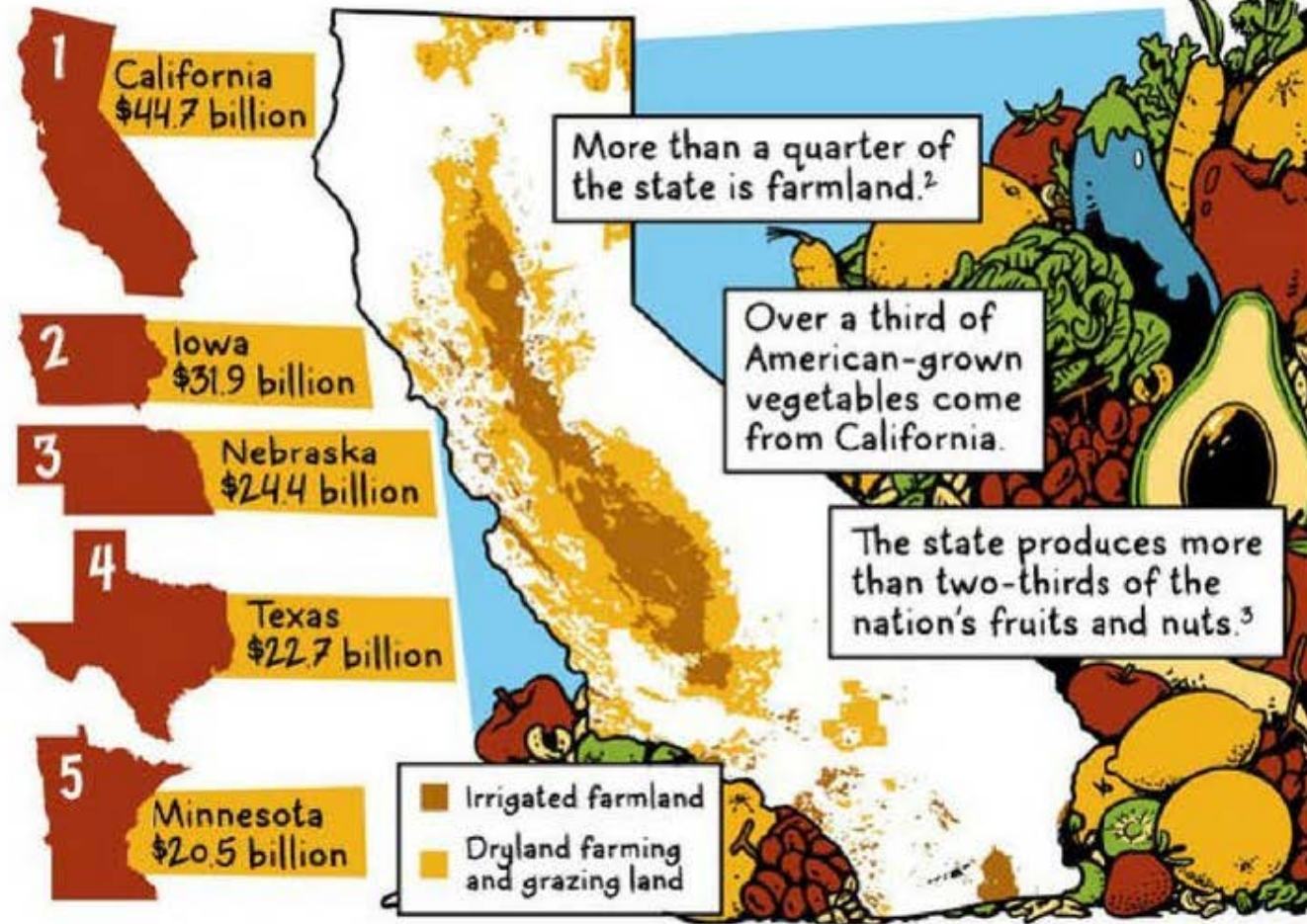
1/3

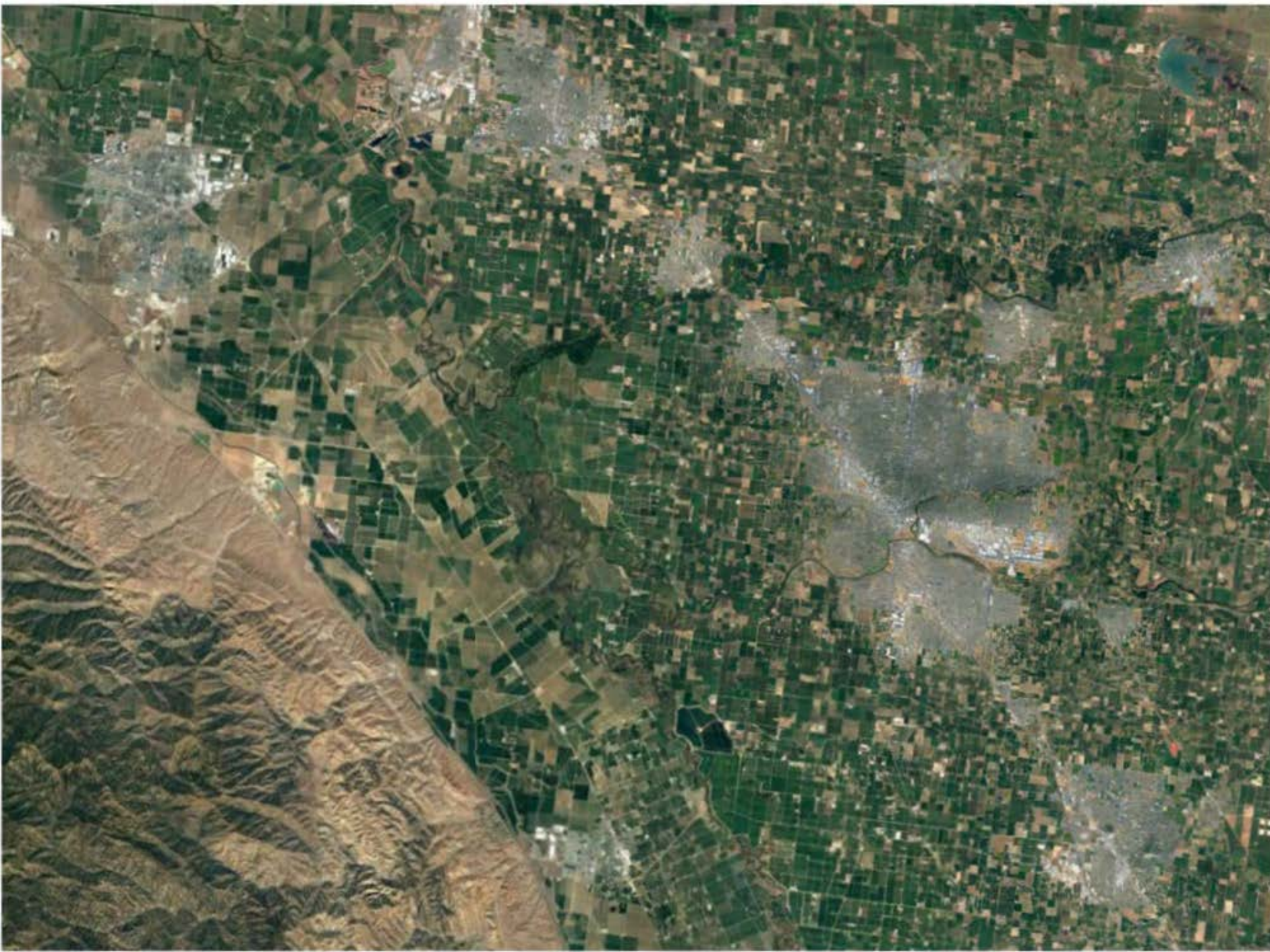
of American-grown
vegetables come from
California

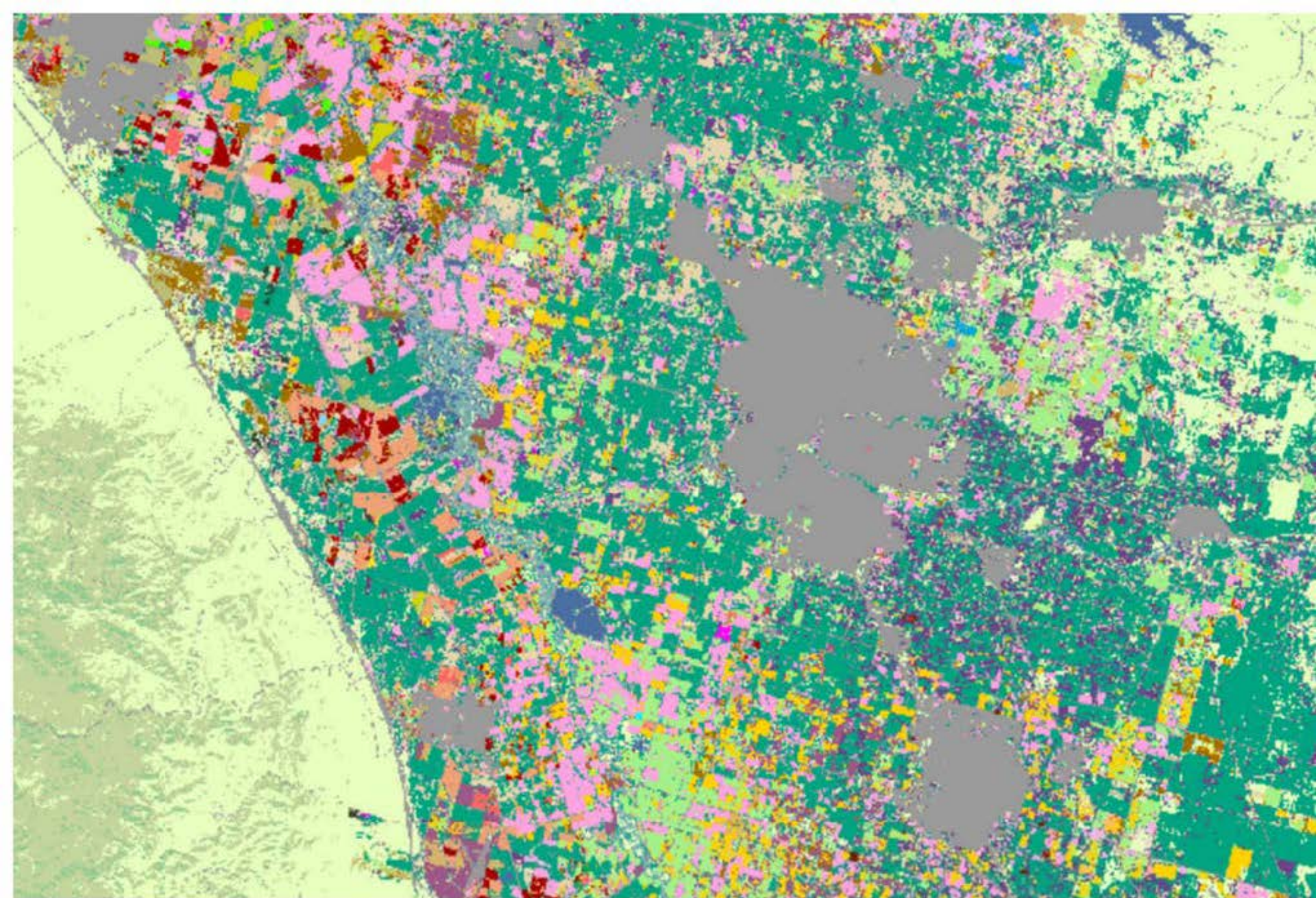
2/3

of the nation's fruits and
nuts are produced in CA

That makes it the biggest farm state in America by far!







Corn, Cotton, Alfalfa, Almonds, Hay, Grapes, Tomatoes, Winter Wheat, Walnuts



CALIFORNIA PRODUCES 99% OF:

- Almonds
- Artichokes
- Dates
- Figs
- Grapes
- Kiwifruit
- Olives
- Peaches
- Pistachios
- Plums, Dired
- Pomegranates
- Rice, sweet,
- Seed, Ladino clover
- Walnuts





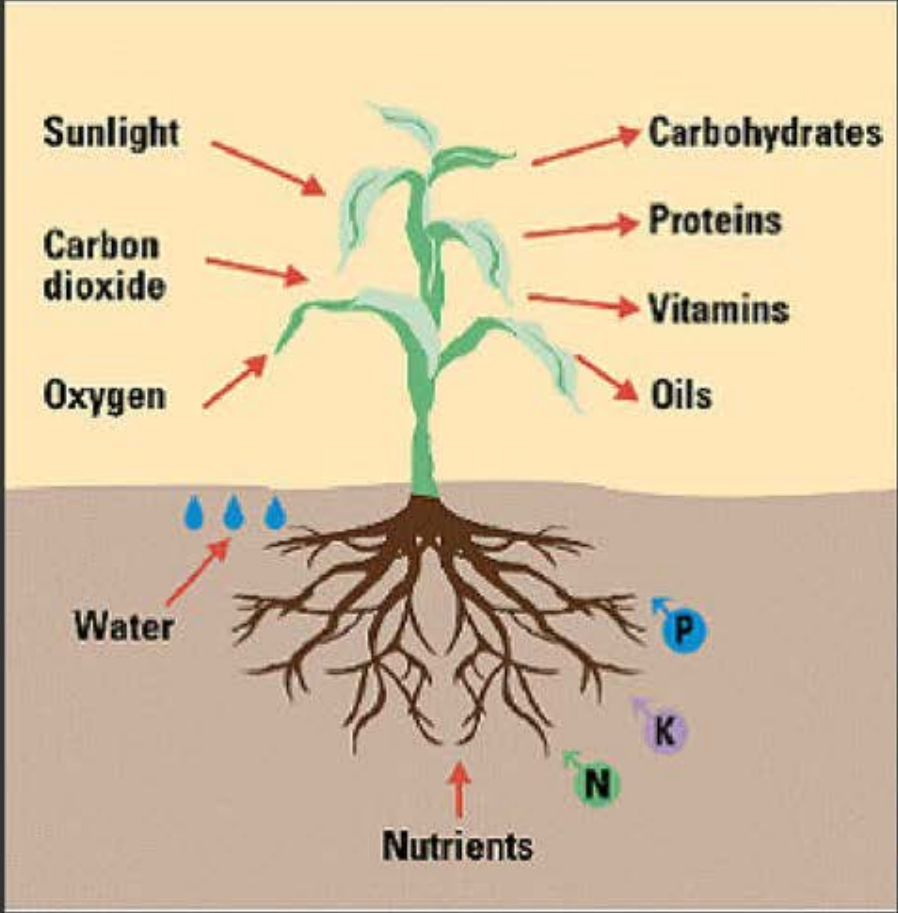
Agricultural food production = soils

Year-round production in some regions:

Lemons, artichokes, avocados, broccoli, cabbage, carrots, cauliflower, celery, lettuce, mushrooms, potatoes, spinach, squash

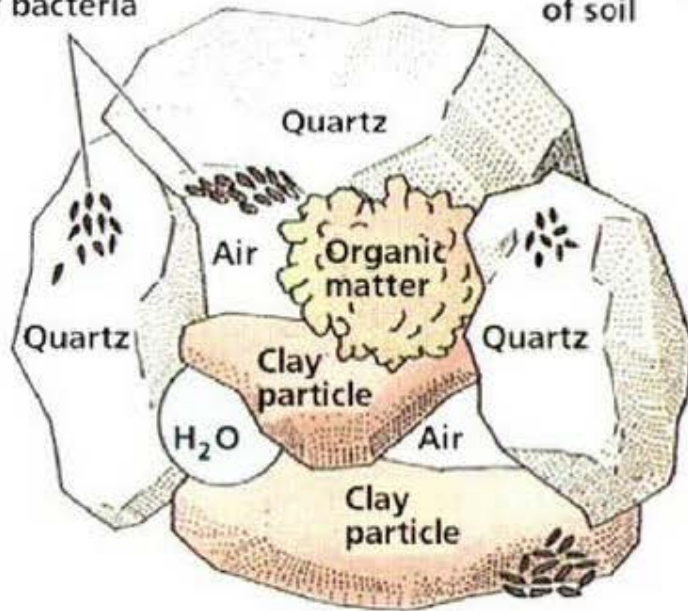
Most “Specialty Crops” in the nation and defined as:

“fruits and vegetables, tree nuts, dried fruits, horticulture and nursery crops (including floriculture)” according to USDA Agricultural Marketing Services



Microcolonies of bacteria

The complexity of soil



Organic matter is 1-6% of total soil mass

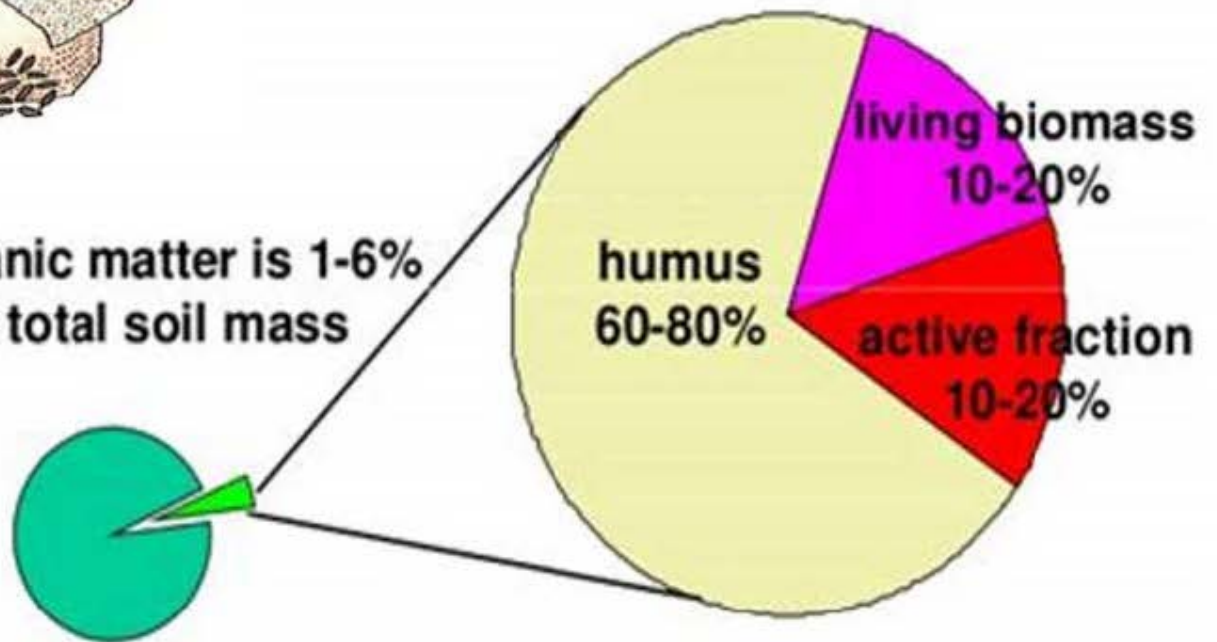
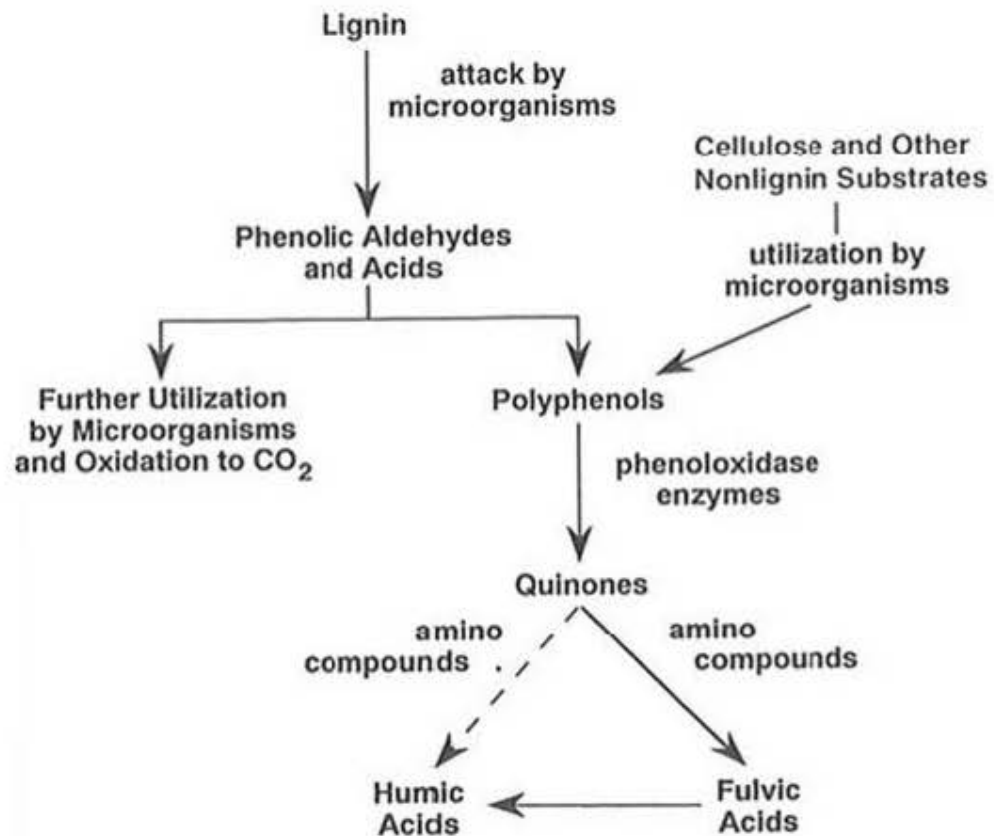


TABLE 3.4. Average Values for Elemental Composition of Soil Humic Substances^a

	Humic acids (%)	Fulvic acids (%)
Carbon	53.8–58.7	40.7–50.6
Hydrogen	3.2–6.2	3.8–7.0
Oxygen	32.8–38.3	39.7–49.8
Nitrogen	0.8–4.3	0.9–3.3
Sulfur	0.1–1.5	0.1–3.6



WATER
RETENTION



20X

Healthy soil has the ability to hold up to 20 times its weight in water (Stevenson, 1994, Humus Chemistry)

“AT HIGH ORGANIC CARBON VALUES, ALL SOILS SHOWED AN INCREASE IN WATER RETENTION”



Available online at www.sciencedirect.com

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Geoderma 116 (2003) 61–76

GEODERMA

www.elsevier.com/locate/geoderma

Effect of soil organic carbon on soil water retention

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"WE NEED HEALTHY SOILS TO ACHIEVE OUR FOOD SECURITY AND NUTRITION GOALS, TO FIGHT CLIMATE CHANGE AND TO ENSURE OVERALL SUSTAINABLE DEVELOPMENT."

-- José Graziano da Silva, FAO Director-General (2015)

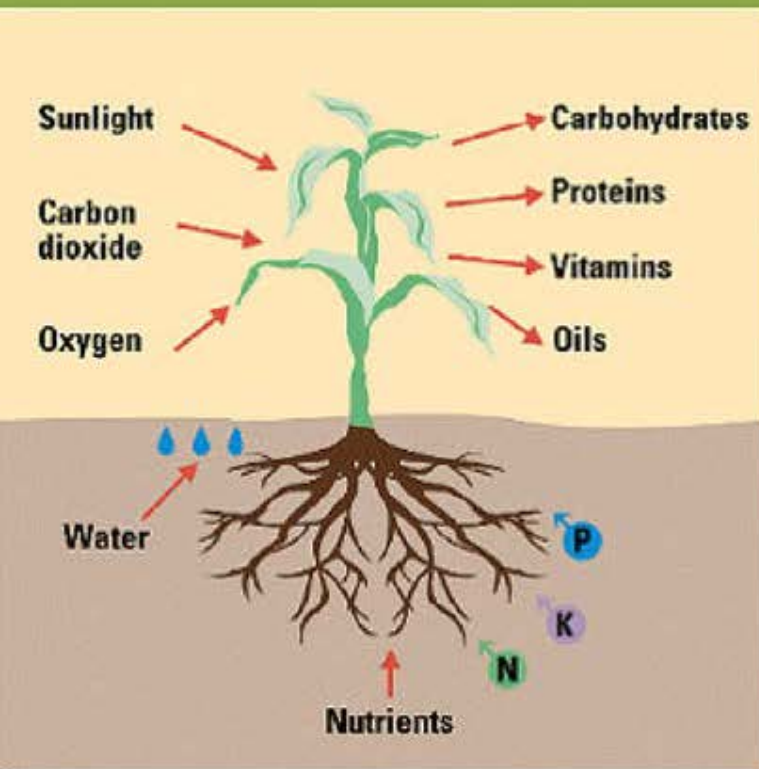


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2015

International Year of Soils

healthy soils for a healthy life

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Claire Chenu: 'Take a closer look at the earth beneath your feet'
Claire Chenu speaks with authority and conviction when it comes to soils.

UC DAVIS



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veterinary medicine**



**1st in the nation for
agriculture**



**1st in the nation for
launching women into
STEM professions**



Professor of soil science and microbial ecology in the Department of Land, Air and Water Resources and director of the Russell Ranch Facility.



UC CE Extension Specialist, Kearney Agricultural Research & Extension Center

Sources:
<http://www.fao.org/soils-2015/en/>, UC Davis

The Brown administration also recognized the importance of soil health in the Governor's 2015-16 proposed budget by highlighting that "as the leading agricultural state in the nation, it is important for California's soils to be sustainable and resilient to climate change."

California Climate Strategy

An Integrated Plan for Addressing Climate Change

Vision

Reducing Greenhouse Gas Emissions to 40% Below 1990 levels by 2030

Goals

Governor's Key Climate Change Strategies



Increase Renewable Electricity Production to 50%



Reduce Petroleum Use by 50% in Vehicles



Double Energy Efficiency Savings at Existing Buildings



Reduce GHG Emissions from Natural and Working Lands



Reduce Short-Lived Climate Pollutants



Safeguard California



CALIFORNIA'S HEALTHY SOILS INITIATIVE

HEALTHY SOILS INITIATIVE



Healthy Soils Initiative: A foundation for agricultural sustainability and climate change resilience

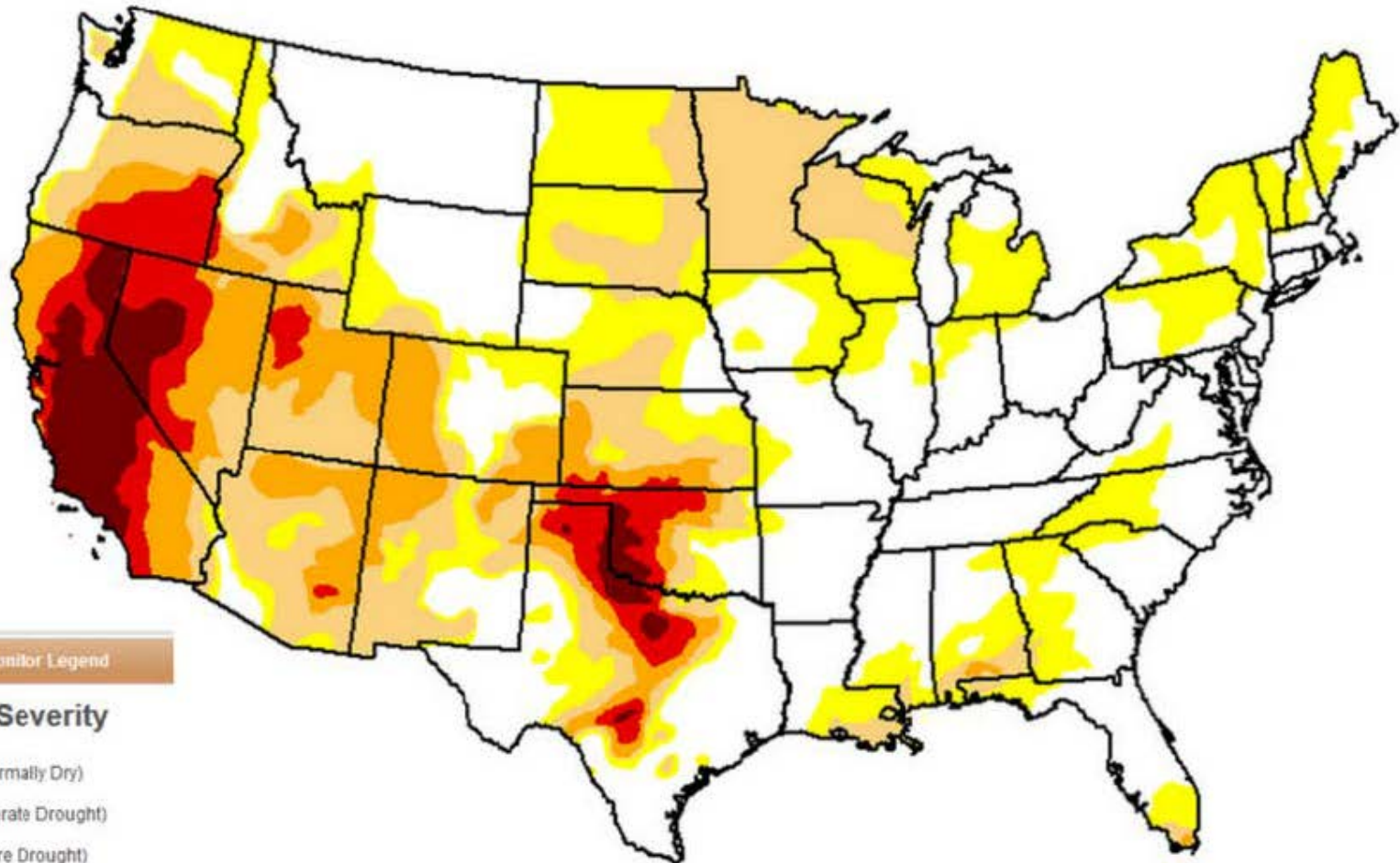
Posted on May 13, 2015 by Office of Public Affairs

Ask a shopper where their food comes from, and the answer might be "the supermarket" or "the farmers' market," or maybe even "a farm" or "a farmer." Those are all true, but of course they aren't the whole story. Ask a farmer the same question, and you're likely to hear "the soil." Ah, now we're getting somewhere...

Identify sustainable and integrated financing opportunities

Develop and fund incentive and demonstration programs with new and existing resources to support farm and ranch land management practices (in accordance with guidance by NRCS, that may include practices such as cover crops and managed grazing)

April 7, 2015



U.S. Drought Monitor Legend

Drought Severity

-  D0 (Abnormally Dry)
-  D1 (Moderate Drought)
-  D2 (Severe Drought)
-  D3 (Extreme Drought)
-  D4 (Exceptional Drought)

<http://droughtmonitor.unl.edu/MapsAndData/ComparisonSlider.aspx>







THE OFFICE OF environmental farming & innovation

CDFA Home > Office of Environmental Farming & Innovation

OFFICE OF ENVIRONMENTAL FARMING & INNOVATION

The mission of the Office of Environmental Farming & Innovation is to serve California by supporting agricultural production and incentivizing practices resulting in a net benefit for the environment through innovation, efficient management and science.



Dairy Digester
Research &
Development Program



The Healthy Soils
Incentive Program



State Water Efficiency
Enhancement Program



Office of Pesticide
Consultation and
Analysis



Alternative Manure
Management Practices

Vision Statement

To be a trusted and valued resource for scientific analysis and support to stakeholders and state agencies in the development and implementation of economically viable agricultural practices that optimize environmental and public health.

Environmental Farming Act

CDFA's Incentive Programs are implemented under the authority of the [Environmental Farming Act \(PDF\)](#). Incentive Programs are developed in coordination with the Science Advisory Panel which facilitates public comment process. Learn more about the [Science Advisory Panel](#).

CLIMATE CHANGE

HEALTHY SOILS PROGRAM

- CDFA appropriated **\$7.5 million** in FY 2016-17 to develop and administer a new incentive and demonstration program on the **CA Healthy Soils Initiative** from the **Greenhouse Gas Reduction Fund**.
Funds allocation:
 - Incentive projects (50%; \$3.75M)
 - Demonstration projects (40%; \$3M).
 - Remainder funds: administrative cost (10%; \$0.75M)
 - Fund specific management practices that have Tier 2 level IPCC scientific data standards



Soil Management Practices

- Cropland Management Practices
 - Cover Crop ([USDA NRCS CPS 340](#))
 - Mulching ([USDA NRCS CPS 484](#))
 - Residue and Tillage Management – No-Till ([USDA NRCS CPS 329](#))
 - Residue and Tillage Management – Reduced Till ([USDA NRCS CPS 345](#))
- Compost Application Practices
 - Compost Application to Annual Crops (CDFA)
 - Compost Application to Perennials, Orchards and Vineyards (CDFA)
 - Compost Application to Grassland (CDFA)

Cropland to Herbaceous Cover Practices

- Contour Buffer Strips ([USDA NRCS CPS 332](#))
- Field Border ([USDA NRCS CPS 386](#))
- Filter Strip ([USDA NRCS CPS 393](#))
- Herbaceous Wind Barrier ([USDA NRCS CPS 603](#))
- Riparian Herbaceous Cover ([USDA NRCS CPS 390](#))
- Vegetative Barriers (601) ([USDA NRCS CPS 601](#))

Establishment of Woody Cover Practices

- Woody Plantings Practices
 - Hedgerow Planting ([USDA NRCS CPS 422](#))
 - Riparian Forest Buffer ([USDA NRCS CPS 391](#))
 - Windbreak/Shelterbelt Establishment ([USDA NRCS CPS 380](#))
- Grazing Lands Practices
 - Silvopasture ([USDA NRCS CPS 381](#))



News Release

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

Media Contacts:

CDFA Public Affairs, (916) 654-0462
steve.lyle@cdfa.ca.gov

CDFA HEALTHY SOILS PROGRAM AWARDS \$5.23 MILLION IN GRANTS



Release
Print Th

SACRAMENTO – December 5, 2017 – The California Department of Food and Agriculture (CDFA) has awarded \$5.23 million in funding to 86 projects as part of its Healthy Soils Program. The program is the first of its kind in the nation, and encourages farmers and ranchers to implement practices that reduce atmospheric greenhouse gases and improve soil health.

The Healthy Soils Program stems from the [California Healthy Soils Initiative](#), a collaboration between state agencies to support development of healthy soils in California. Other statewide projects include the [Sustainable Agricultural Lands Conservation \(SALC\)](#), which protects agricultural land from development and also helps reduce harmful emissions. Both programs are funded from the California Climate Investments Fund.

“California continues to lead the nation in supporting smart climate programs that address on-farm challenges and promote agricultural sustainability,” said CDFA Secretary Karen Ross. “Soil has the transformative power to help us stabilize our changing climate. By capturing greenhouse gas emissions and storing them underground, we improve both the atmosphere and soil.”

In 2016, CDFA allocated \$7.5 million to develop and administer the Healthy Soils Program as part of its role in the California Climate Investments initiative, which helps state agencies invest cap-and-trade auction proceeds in projects that reduce greenhouse gas emissions and provide a variety of additional benefits to California communities.

The \$5.23 million in HSP funding is split between 64 incentive programs and 22 demonstration projects, both of which promote widespread adoption of conservation management practices statewide.

Information about the 2017 HSP Incentives Program is available at <https://www.cdfa.ca.gov/oefi/healthysoils/IncentivesProgram.html>

Information about the 2017 HSP Demonstration projects is available at <https://www.cdfa.ca.gov/oefi/healthysoils/DemonstrationProjects.html>

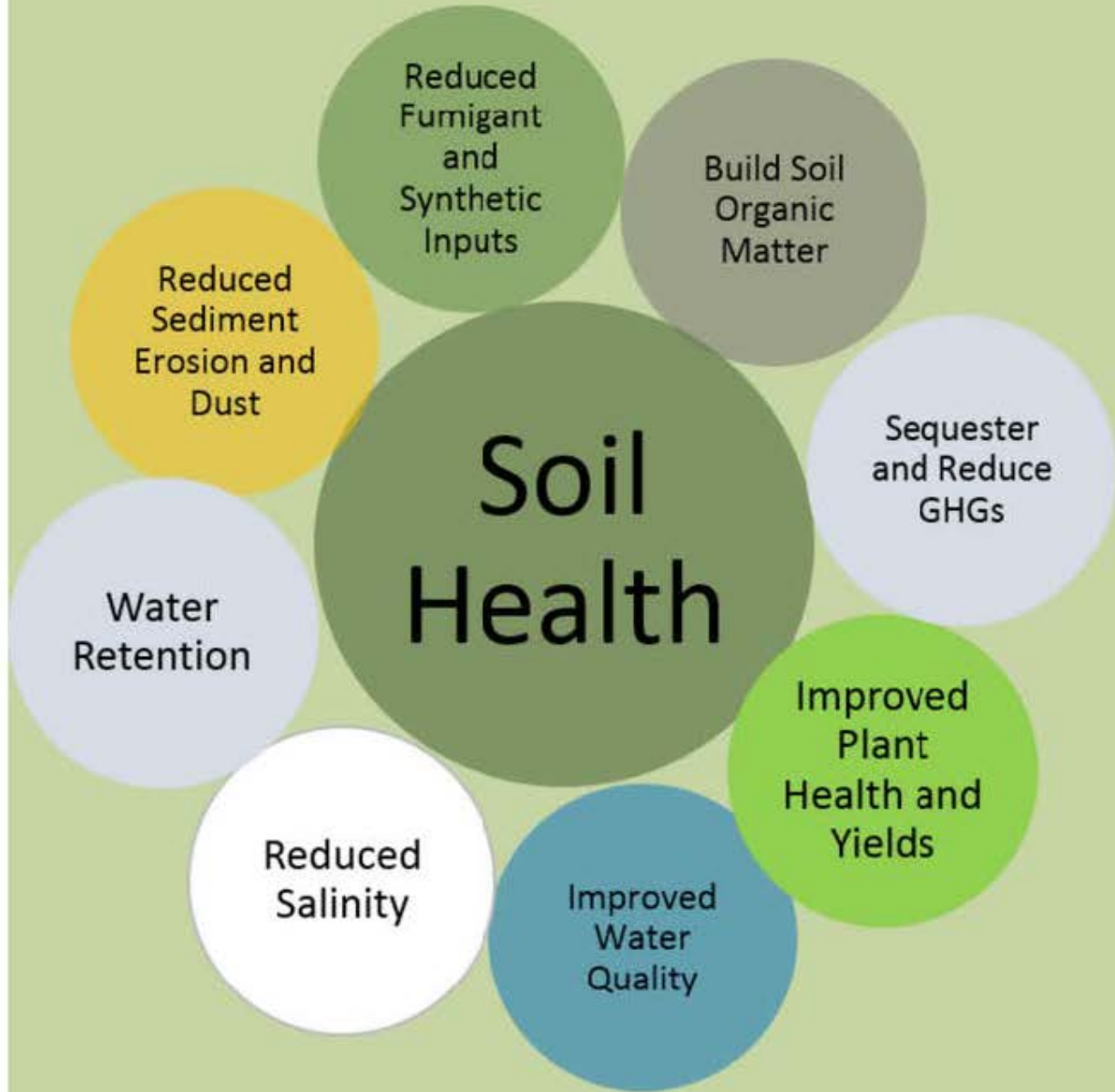


HEALTHY SOILS PARTNERS

- ARB Quantification Methodology Team
- USDA-NRCS Team
- CDFA EFA SAP members
- University experts (compost white paper requirements)
- Member of the public and agricultural communit
- CDFA Healthy Soils Team
Geetika Joshi (PhD.) and Guihua Chen (PhD.), Amy Uber, Kelly Gravuer (Grad student Intern)
- SGC – Support for Technical Assistance
- Secretary Ross



SISTER AGENCIES



Reduced Fumigant and Synthetic Inputs

Build Soil Organic Matter

Sequester and Reduce GHGs

Improved Plant Health and Yields

Improved Water Quality

Reduced Salinity

Water Retention

Reduced Sediment Erosion and Dust

Soil Health



THANK YOU FOR THE INVITATION AND YOUR ATTENTION

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