HEALTHY SOILS = HEALTHY LIVES

CAT-PHWG | 2-7-18

Amrith (Ami) Gunasekara
Science Advisor to the Secretary
Manager, Office of Environmental Farming and Innovation
ESSENTIAL NUTRIENTS FOR YOUR BODY

- Vitamin A
- Vitamin C
- Vitamin E
- Dietary Fiber
- Magnesium
- Calcium
- Omega-3
- Folic Acid (Vitamin B9)
- Protein
- Iron

Source: pbs.twimg.com/media
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
Corn, Cotton, Alfalfa, Almonds, Hay, Grapes, Tomatoes, Winter Wheat, Walnuts
CALIFORNIA PRODUCES 99% OF:

- Almonds
- Artichokes
- Dates
- Figs
- Grapes
- Kiwifruit
- Olives

- Peaches
- Pistachios
- Plums, Dried
- Pomegranates
- Rice, sweet,
- Seed, Ladino clover
- Walnuts
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

DATA SOURCE: 2014 ANNUAL CROP REPORT BY USDA NASS
Sunlight → Carbohydrates
Carbon dioxide → Proteins
Oxygen → Vitamins
Water → Oils
Nutrients → P, K, N
Organic matter is 1-6% of total soil mass.
TABLE 3.4. Average Values for Elemental Composition of Soil Humic Substances

<table>
<thead>
<tr>
<th></th>
<th>Humic acids (%)</th>
<th>Fulvic acids (%)</th>
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<tbody>
<tr>
<td>Carbon</td>
<td>53.8 - 58.7</td>
<td>40.7 - 50.6</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>3.2 - 6.2</td>
<td>3.8 - 7.0</td>
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<td>Oxygen</td>
<td>32.8 - 38.3</td>
<td>39.7 - 49.8</td>
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<td>Nitrogen</td>
<td>0.8 - 4.3</td>
<td>0.9 - 3.3</td>
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<td>Sulfur</td>
<td>0.1 - 1.5</td>
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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."

Effect of soil organic carbon on soil water retention

W.J. Rawls\textsuperscript{a}, Y.A. Pachepsky\textsuperscript{b,*}, J.C. Ritchie\textsuperscript{a}, T.M. Sobecki\textsuperscript{c}, H. Bloodworth\textsuperscript{c}

\textsuperscript{a} USDA-ARS Hydrology and Remote Sensing Laboratory, Beltsville, MD 20705, USA
\textsuperscript{b} USDA-ARS Animal Waste Pathogen Laboratory, Beltsville, MD 20705, USA
\textsuperscript{c} USDA-NRCS, Resource Assessment Division, Washington, DC 200013, USA
"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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Claire Chenu: ‘Take a closer look at the earth beneath your feet’

Claire Chenu speaks with authority and conviction when it comes to soils.
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.”
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)
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.

**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.
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)
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 Investments initiative, which helps state agencies invest cap-and-trade auction proceeds in projects that reduce greenhouse emissions and provide a variety of additional benefits to California communities.

The $5.23 million in HSP funding is split between 64 incentives 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/oei/healthysolls/IncentivesProjects](https://www.cdfa.ca.gov/oei/healthysolls/IncentivesProjects).

Information about the 2017 HSP Demonstration projects is available at [https://www.cdfa.ca.gov/oei/healthysolls/DemonstrationProjects.html](https://www.cdfa.ca.gov/oei/healthysolls/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 community
- 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
Reduced Fumigant and Synthetic Inputs
Build Soil Organic Matter
Reduced Sediment Erosion and Dust
Sequester and Reduce GHGs
Water Retention
Improved Water Quality
Reduced Salinity
Improved Plant Health and Yields
THANK YOU FOR THE INVITATION AND YOUR ATTENTION

AMRITH (AMI) GUNASEKARA, PHD.
AMRITH.GUNASEKARA@CDFA.CA.GOV