Healthy Soils, Healthy Communities: Connecting agroecology and environmental health

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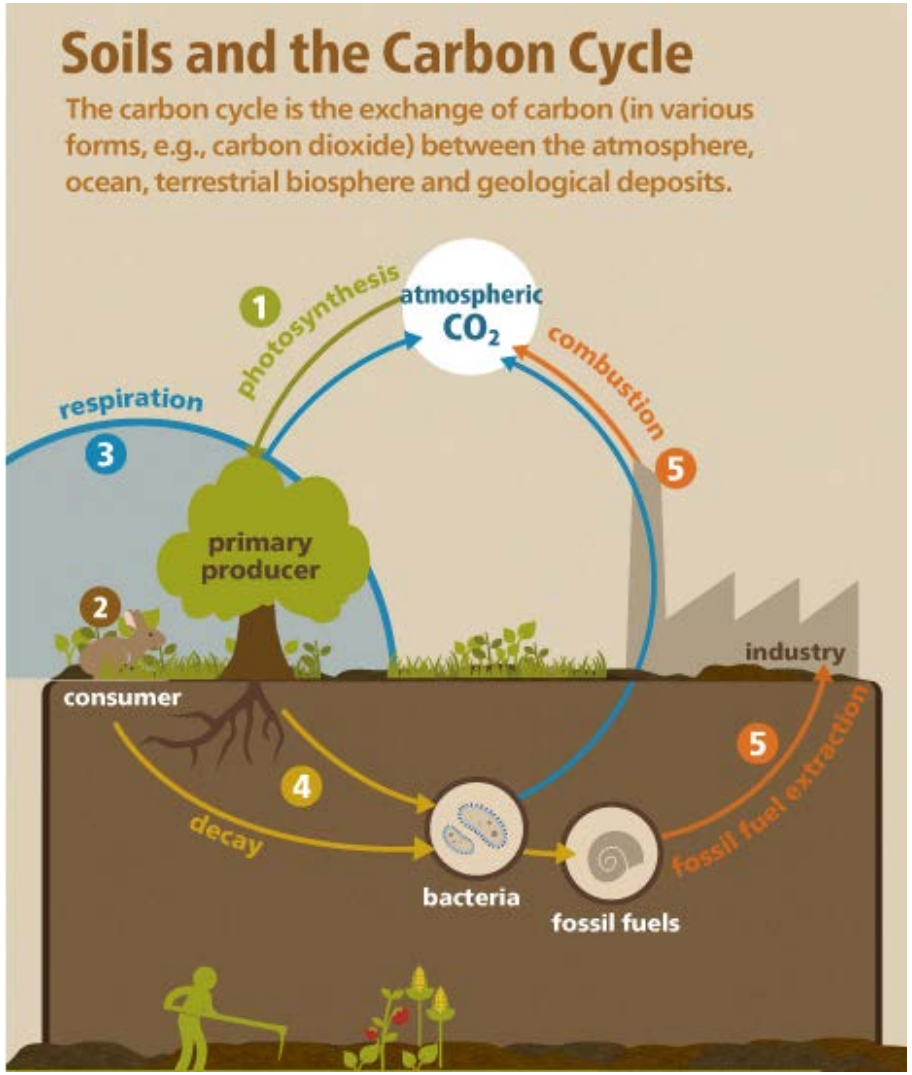
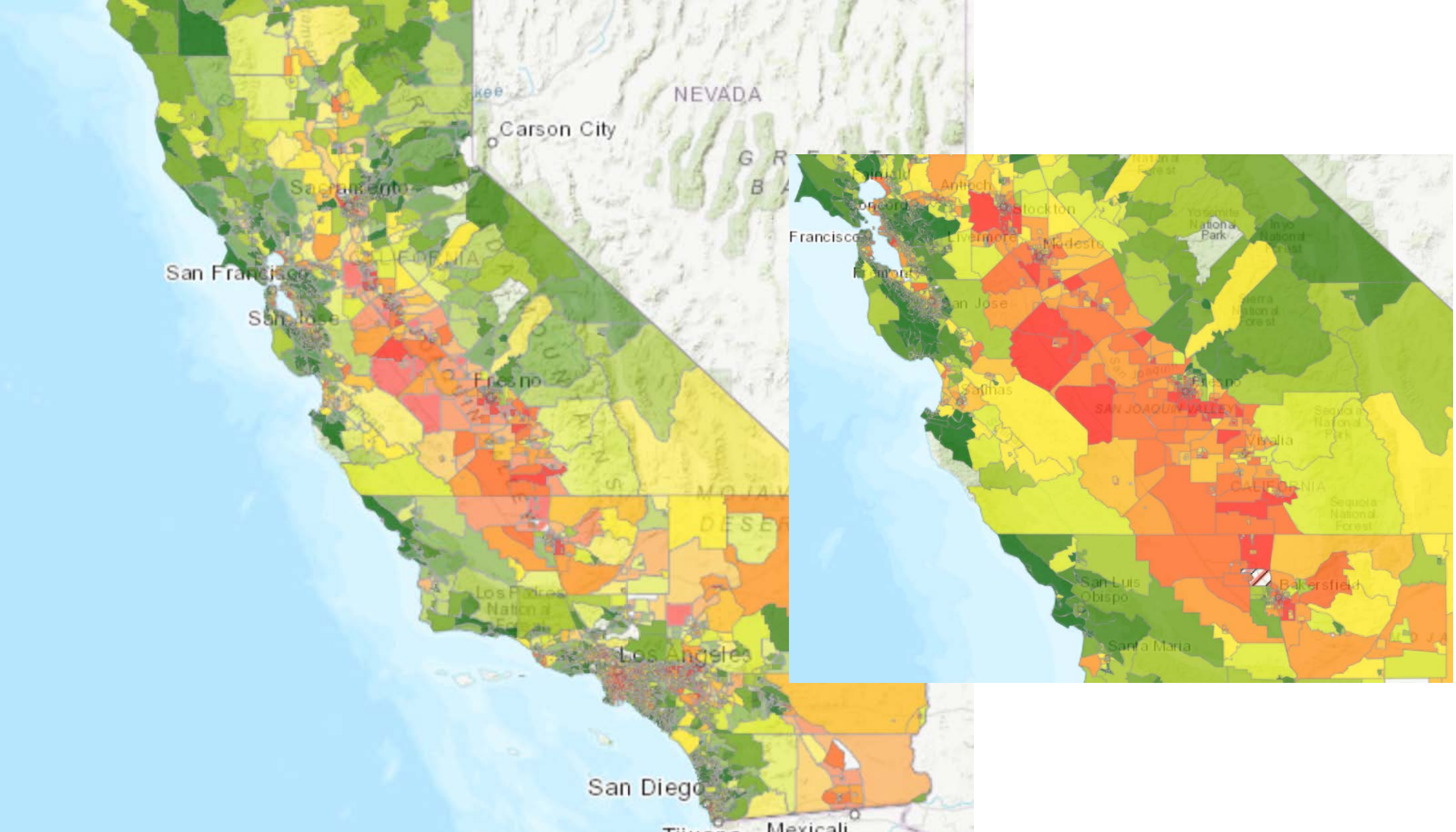
Healthy Soils and Carbon 101



- The carbon sink capacity of the world's agricultural and degraded soils is 50 to 66% of the historic carbon loss of 42 to 78 gigatons of carbon (Lal 2004)
- Soil carbon sequestration has the potential to offset 5 to 15% of the global fossil-fuel emissions (Lal 2004).
- French Ministry of Agriculture – globally increase soil carbon by 4% per year, halt annual increase of CO2
- Current atmospheric CO2 > 400ppm, to get back to the safe zone (350ppm) we have to pull carbon out of the atmosphere.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Bakersfield
San Luis Obispo
Santa Maria

Soils & Health: Water Quality

- Reduced runoff – soils higher in organic matter form more stable aggregates, which hold on to both nutrients and pollutants better
- Buffer strips and perennial hedgerows slow runoff
- Soils managed organically or with a combination of organic and conventional techniques have more denitrifiers – microbial communities that turn environmentally reactive forms of nitrogen to non-reactive nitrogen gas
  - PNAS – Nitrate leaching from orchards 4.4–5.6 times higher in conventional plots than in organic plots (Kramer 2006)

Soils & Health: Air quality

- VOC emissions from fumigants reduced significantly with high SOM
  - Incorporating municipal compost reduced Telone emissions 80-85% (Yates 2012)
  - Five different organic amendments at 5% (w/w) increased fumigant degradation 1.4-6.3-fold (Quin 2009)
- Composting vs burning farm waste – reduce fine particulates
  - UC Davis study of pm2.5 and pm0.1 in San Joaquin Valley – 27-34% organic carbon (Ngo 2010)

Ammonia can combine with volatile organic compounds (VOC), nitrogen oxides (NOx) and sulfur dioxide to form small, harmful particles (PM2.5). Illustration: © iStockphoto.com | ikryannikovgmailcom

From Lindsay Konkel, *FERN* Feb 5 2018

Agroecology and soil health practices

- Reduce disturbance
- Maintain soil cover
- Keep living roots and a healthy microbial community
- Compost application
- Cover crops
- Complex crop rotations
- Polyculture – agroforestry, diversification, hedgerows
- Re-integrate livestock and crop production
- Biological pest control – beneficial insect habitat

Principles of agroecology

1. Enhance recycling of biomass, optimizing nutrient availability and balancing nutrient flow.

2. Securing favorable soil conditions for plant growth, particularly by managing organic matter and enhancing soil biotic activity.

3. Minimizing losses due to flows of solar radiation, air and water by way of microclimate management, water harvesting and soil management through increased soil cover.

4. Species and genetic diversification of the agroecosystem in time and space.

5. Enhance beneficial biological interactions and synergisms among agrobiodiversity components thus resulting in the promotion of key ecological processes and services. (Altieri 2005)

Healthier food systems

- “Is the conversation around healthy soil identifying the holistic nature, the big picture importance of it? Is it really identifying a vision for the future of farming and how that can address multiple environmental and social needs?” – Brent Newell Center for Race Poverty and the Environment

Healthy Soils & Cities

- California cities cover 3.6 million acres
- 75% recycling goal for urban waste – San Francisco composting policy created over 500 jobs
- Partnerships – LAFPC key recommendation on community composting
- 90,000 brownfield sites in CA
- Urban agriculture - small acreage, big impact
- Green space – essential for building healthy lifestyles

Connecting the Dots

- “What we are really talking about is getting more people who are paying attention to living systems and putting themselves in direct relationship with them and feeling a sense of responsibility over what happens.” – Doria Robinson, Urban Titlth

Photo: Urban Tilth

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