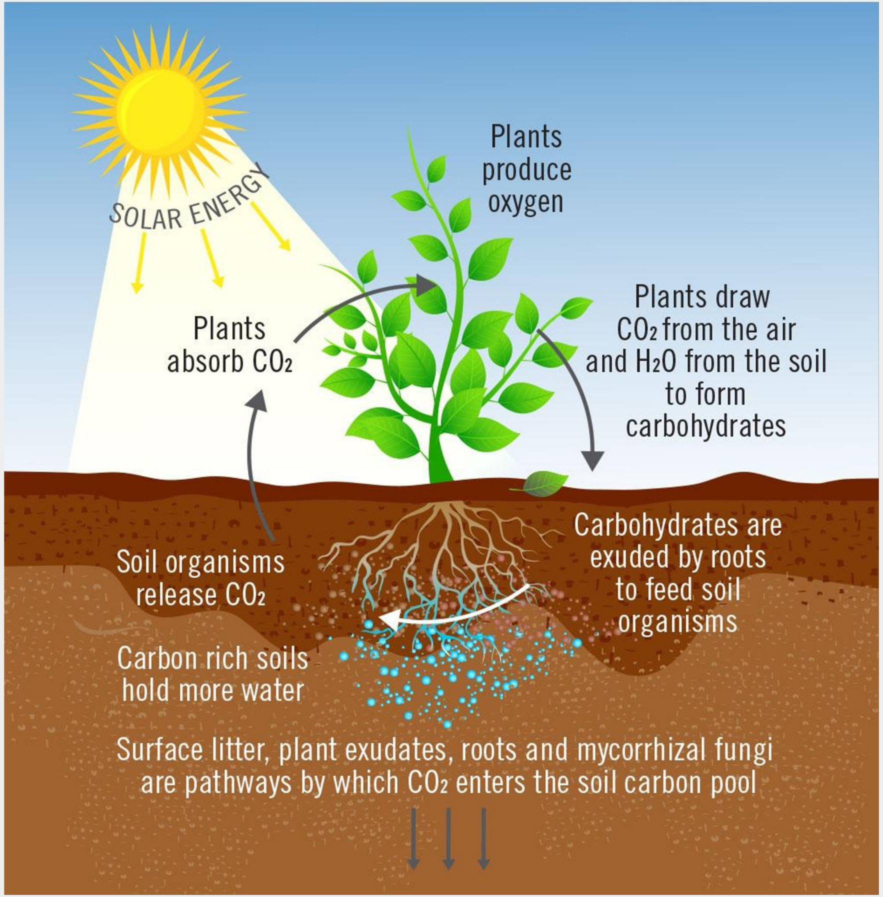
Natural climate solutions in an agricultural context



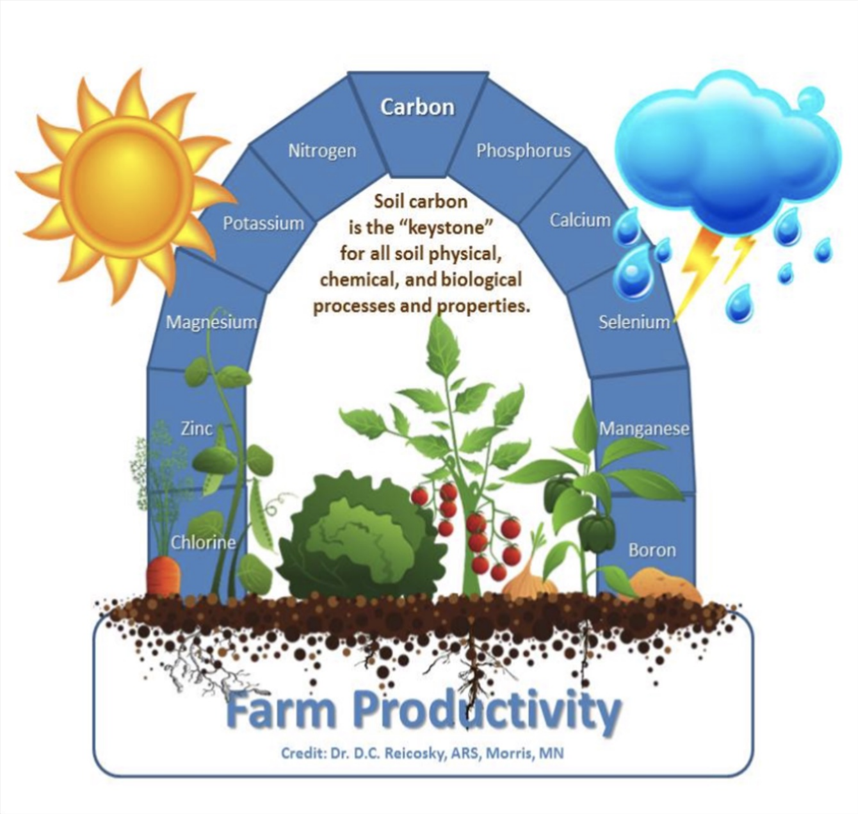
Current Terminology:

- Nature-based climate solutions
- Drawdown
- Carbon sequestration
- Climate-beneficial or climate smart land management
- Regenerative agriculture
- **Carbon farming**

All refer to:

Actively managing agricultural land to increase the rate of photosynthetic capture of CO_2 from the atmosphere AND increasing its long-term storage as organic carbon in soils and woody biomass (carbon sequestration).

All Farming is Carbon Farming



To be an effective climate mitigation strategy at the farm-scale, the key is to capture and store more carbon than is being lost from the system.

Example Carbon Farming Practices:
<u>Increasing the rate of carbon capture</u>: cover cropping, compost application to degraded soils

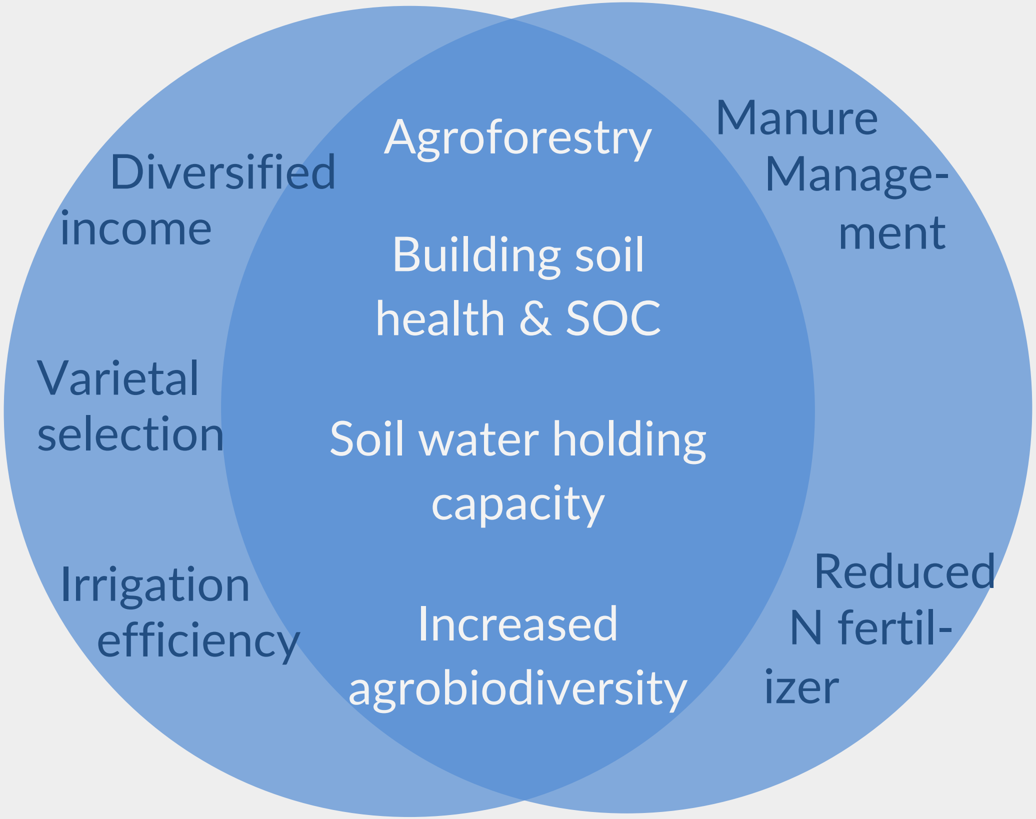
<u>Increasing long-term carbon storage:</u> Agroforestry practices such as planting riparian forested buffers, hedgerows, windbreaks, or re-oaking rangelands create opportunities for increasing carbon storage and the rate of carbon capture.

<u>Reducing losses of carbon:</u> reducing tillage, preventing soil erosion, eliminating agricultural burning through whole orchard recycling.

Climate adaptation and mitigation are two sides of the same coin

Adaptation

Adaptation measures support farm resilience
in the face of climate change-driven disruptions.



Mitigation

Mitigation measures reduce GHG emissions or sequestering carbon from the atmosphere in plant biomass and soils, while also supporting farm resilience to climate change.

Investments in agricultural climate solutions should be the centerpiece of the State's *Sustainable Agricultural Land Conservation Strategy*

When natural resources are depleted so too is the farm operation's climate resilience and long-term economic viability

Investments in natural climate solutions are also investments in habitat provision, biodiversity, groundwater and streamflow recharge, water quality, farm viability and diversification, etc.

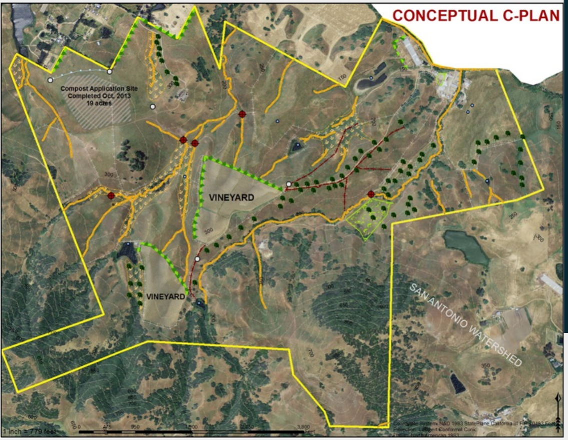
Carbon Sequestration Potential on Marin County Agricultural Lands

Agricultural Practice	Total Potential Acres	Sequestration Factor (MTCO2e/acre/year)	Sequestration Potential (MTCO2e/year)	Sequestration Lifespan
Riparian restoration	5,700	9.16	52,212	20
Compost on rangelands	60,217	1.49	89,723	20
Compost on croplands	407	1.18	482	6
Compost on vineyards	195	4.4	860	1
Hedgerow planting	267	1.49	399	34
Prescribed grazing	101,496	0.005	507	10
Range planting	28,271	0.502	14,192	10
Silvopasture	17,254	1.48	25,486	80
Windbreak/shelterbelt	852	1.48	1,263	80
Critical area planting	353	1.9	671	10
Total:			**185,795**	

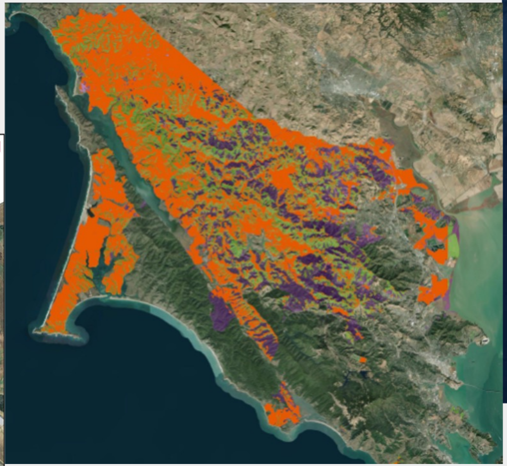
California Agriculture: Carbon Neutral by 2030.
One of many possible scenarios to sequester carbon on natural and working lands while building economic, ecological, and social resilience

Practice	Annual New Acres Implemented	Increase in Annual MMT CO_2e Sequestration (from new acres)	Acres Implemented by 2030	MMT CO_2e Sequestered Annually by 2030
Rangeland compost	110,000	0.16	1,210,000	10.80
Pasture compost	192,500	0.87	2,117,000	10.40
Cropland compost	200,000	0.90	2,200,000	9.90
Agroforestry	190,000	0.19	2,090,000	12.54
Riparian restoration	8,500	0.009	93,500	0.56
Prescribed grazing	218,000	0.01	2,398,000	0.72
Avoided N fertilizer (cropland)	200,000	0.19	2,200,000	2.10
Cover Crops	200,000	0.05	2,200,000	0.55
Total	**916,500 ac.**	**2 MMT CO_2e/yr**	**10,081,500 ac.**	**47.57 MMT CO_2e/yr**

Scaling climate-smart agriculture requires investing in local and regional agricultural conservation partnerships

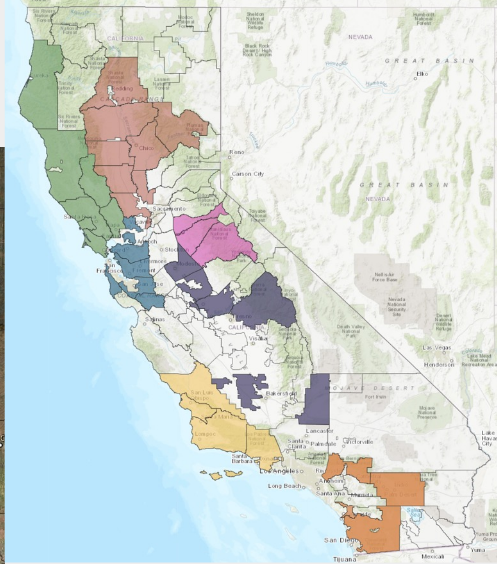


Farm level: producer engagement, planning & implementation



County level: ag community engagement in climate action planning & policy

Regional level: carbon farming hubs & regional planning



State climate and agriculture policy, scoping plan & funding programs

Scaling climate-smart agriculture will require strategic investments to:

- Foster innovation and development of regionally appropriate farmer-centered solutions

- Enable communication between and among producers, agricultural conservation organizations, researchers, and policy makers

- Assess region-specific opportunities, barriers and needs through understanding distinct agricultural, ecological, and social landscapes

- Collectively shape agricultural conservation programs, policies, and emerging markets to support farmer-centered strategies, create innovative funding pathways, and overcome institutional barriers

Our greatest barrier is the lack of investment in local and regional agricultural conservation partnerships <u>as a core strategy</u> in creating healthy, climate resilient farming systems.