Resilient Communities and Natural Infrastructure (NI)

Contra Costa County will increase resilience to climate hazards and foster community health.

Most of the strategies for Resilient Communities and Natural Infrastructure are not associated with GHG emissions savings. NI-4 is included here because it both contributes significantly to the County's resilience efforts and results in measurable GHG emissions reductions. See Chapter 5 for a detailed description of other strategies that fall under this goal.

NI-4: Sequester carbon on natural and working lands in Contra Costa County.

This strategy increases opportunities to store carbon through natural carbon sequestration on public and private lands, increased tree planting by the County and public and private partners, and installation of green infrastructure. Additional actions pertaining to tree planting are in strategy NI-5 in **Chapter 5.**

	2030	2045
GHG emissions reduction (Absolute $MTCO_2e$)	22,630	88,910

Strategy NI-4 Co-benefits:

Enhanced recreation opportunities

Greater community resilience

Improved air quality

Improved public health

Increased economic opportunities

Increased resilience to pests

Strategy NI-4 Actions:

- Pursue implementation of recommendations from the carbon sequestration feasibility study, *Healthy Lands, Healthy People*.
- Continue to support and work with key partners to maintain existing and establish new pilot programs for carbon sequestration on agricultural land.
- Promote regenerative agricultural and landscaping techniques that incorporate cover crops, mulching, compost application, field borders, alley cropping, conservation crop rotation, prescribed grazing, and reduced tillage to promote healthy soil and soil conservation. (Supported by COS-P2.12)
- Support soil conservation and restoration programs. Encourage agricultural landowners to work with agencies such as the USDA's NRCS and Contra Costa RCD to reduce erosion and soil loss. (COS-P2.11)
- Coordinate with farming groups, ranchers, the Contra Costa Resource Conservation District, and the University of California Cooperative Extension to identify and promote varieties of feedstock, livestock, and crops that are resilient to rising temperatures and changing precipitation patterns and that increase carbon sequestration.
- Explore ways to increase carbon sequestration on County-owned properties.
- Partner with regional landowners and agencies to establish local carbon sequestration programs and incentives.
- Consider the development of carbon offset protocols and guidance to provide technical support to applicants and County permitting staff to promote appropriate natural sequestration on natural and developed lands.
- Ensure that any local or regional carbon sequestration program that the County establishes, promotes, supports, or joins demonstrates benefits to unincorporated communities that face environmental justice issues.
- Explore the potential for the public to support tree planting and maintenance of existing trees. (Supported by COS-P6.2)

Healthy Lands, Healthy People

Contra Costa County completed a feasibility study in 2023 to explore how agriculture, parks, gardens, and open space in the county could be used to sequester carbon and support carbon neutrality efforts. The study is funded by a grant from the California Department of Conservation. Its findings have informed quantification assumptions for Strategy NI-4. Implementation of the recommendations in this study will inform future updates of this 2024 CAAP.

- Establish a mechanism to support expanded tree planting and maintenance activities, particularly in areas with few trees.
- Support protection, restoration, and enhancement of creeks, wetlands, marshes, sloughs, and tidelands, and emphasize the role of these features in climate change resilience, air and water quality, and wildlife habitat. (COS-P5.1)
- Inventory wetlands, floodplains, marshlands, natural watercourses, riparian corridors, and adjacent lands that could potentially support climate adaptation (through flood management, filtration, or other beneficial ecosystem services) and mitigation (e.g., carbon sequestration). (COS-A5.1)
- Encourage and support conservation of natural lands outside the urban limit line in the unincorporated county.
- Explore new funding and financing opportunities for climate adaptation and resilience projects, including the creation of a Climate Resilience District, issuance of bonds—including bonds that can be marketed as "green bonds" -- as a potential financing mechanism, and similar opportunities.
- Require that any mitigation of air quality impacts occur on-site to the extent feasible to provide the greatest benefit to residents in unincorporated communities. For mitigation that relies on offsets, require that the offsets be obtained from sources as near to the project site as possible or from sources that would improve air quality in an Impacted Community. If the project site is within or adjacent to an Impacted Community, require offsets or mitigation within that community unless determined infeasible by the County. (HS-P1.6)

Climate Resilience Districts

Climate resilience districts are special districts that can raise and allocate money to fund projects and operations that address climate change adaptation efforts, such as those to help protect against sea level rise, wildfire, and drought. They have the authority to establish special taxes, assessments, or other charges. Local governments may establish climate resilience districts under Assembly Bill 852, adopted in 2022.

NI-2: Protect against and adapt to increases in the frequency and intensity of wildfire events.

This strategy aims to increase community resilience to the direct and indirect effects of wildfires, both locally and regionally. Public and private property shall be designed and maintained to minimize the risk of damage from wildfires; infrastructure systems will be hardened and designed to include redundancy; and emergency management plans and practices for wildfires will be responsive to the needs of Impacted Communities.

Strategy NI-2 Co-benefits:

Greater community resilience | Improved community equity | Improved public health | Reduced disaster impacts

Strategy NI-2 Actions:

- Deny entitlements for projects creating additional residential units (i.e., units not allowed by-right) in Very High Fire Hazard Severity Zones in the LRA or SRA. Discourage such projects in High Fire Hazard Severity Zones in the SRA and discourage them in such zones in the LRA unless adequate fire protection services are provided.[11] (HS-P7.1)
- Require any construction of buildings or infrastructure within a High or Very High Fire Hazard Severity Zone in the Local or State Responsibility Areas, or in areas that may be designated as the Wildland-Urban Interface, to incorporate fire-safe design features that meet the applicable State Fire Safe Regulations and Fire Hazard Reduction Around Buildings and Structures Regulation for road ingress and egress, fire equipment access, and adequate water supply. (HS-P7.2)
- Require subdivisions in the High Fire Hazard Severity Zone in the Local or State Responsibility Areas, or projects requiring a land use permit in the High or Very High Fire Hazard Severity Zone in the Local or State Responsibility Areas, to complete a site-

[11] High and Very High Fire Hazard Severity Zones are mapped by CAL FIRE. Designations are based on factors that influence fire likelihood and fire behavior. Many factors are considered, such as fire history, existing and potential fuel (natural vegetation), predicted flame length, blowing embers, terrain, and typical fire weather for the area.

specific fire protection plan. Work with the appropriate fire protection district to review and revise the fire protection plans. (HS-P7.4)

- Work with property owners in High or Very High Fire Hazard Severity Zones or in areas that may be designated as the Wildland-Urban Interface, to establish and maintain fire breaks and defensible space, vegetation clearance, emergency access roads, water supply and fire flow, signage, and firefighting infrastructure that meet adopted State, County, or community fire safety standards. (HS-P7.5)
- Coordinate with energy service providers to underground power lines, especially in the Wildland-Urban Interface and Fire Hazard Severity Zones. (HS-P7.10)
- Review indoor air filtration standards and consider whether filtration requirements can and should be strengthened for projects permitted by the County.
- Work with community organizations to help Impacted Communities have access to financing and other resources to reduce the fire risk on their property, prepare for wildfire events, and allow for a safe and speedy recovery.

Fire Protection Plans

According to General Plan Policy HS-P7.4, a fire protection plan shall include measures for fire-resistant construction materials and modifying fuel loading, as well as a plan to maintain that protection over time. The fire protection plan shall include:

a) A risk analysis
b) Fire response capabilities
c) Defensible space requirements
d) Fire safety requirements for infrastructure
e) Building ignition resistance
f) Mitigation measures and design for non-conforming fuel modification
g) Wildfire education
h) Maintenance and limitations
i) A plan for emergency preparedness, response, and evacuation

NI-5: Minimize heat island effects through the use of cool roofs, green infrastructure, tree canopy, cool paint and pavement, and other emerging strategies.

With this strategy, impacts of heat islands are addressed and minimized through construction practices for buildings and structures, including through ample shading opportunity and other green infrastructure improvements, including green stormwater infrastructure.

Strategy NI-5 Co-benefits:


Improved air quality


Improved community equity


Improved public health

Increased economic opportunities


Reduced disaster impacts


Reduced resource use

Strategy NI-5 Actions:

- Require landscaping for new development to filter and retain runoff and support flood management and groundwater recharge. (COS-P-7.7)
- Promote installation of drought-tolerant green infrastructure, including street trees, in landscaped public areas. (COS-P7.8)
- Increase tree planting in urbanized areas and open spaces, where ecologically appropriate, emphasizing areas with limited existing tree cover, using low-maintenance native tree species that are low fire risk, and ensuring water supply resources are not compromised. (Supported by COS-P6.2)
- Consider preparing and implementing an Urban Forest Management Plan, or Tree Plan for the unincorporated county.
- Provide shade trees or shade structures at parks, plazas, and other outdoor spaces where feasible. (HS-P8.5)

- When updating the County ordinances that relate to trees and green infrastructure, consider whether tree removal and/or replanting requirements adequately promote expansion of the tree canopy and green infrastructure in Impacted Communities. (Supported by TR-A2.2, HS-P2.2, and HS-A2.5)
- Support efforts to develop incentive programs for home and business owners, school districts, and other local and regional property owners to increase the adoption of cool roofs, green infrastructure, and other cooling strategies on private property.

Urban Heat Islands: Tree Cover and Impervious Surfaces

The urban heat island effect is one of the most important aspects of how neighborhood conditions can exacerbate extreme heat. Urban heat islands are areas with little tree cover and significant portions of land covered by impervious surfaces or artificial structures covered with impenetrable materials, such as pavement and rooftops. Temperatures in these areas may be significantly hotter than in surrounding areas, especially at night, because impervious surfaces retain heat absorbed throughout the day. Addressing heat islands may also be an important lever for health equity, as researchers have found that low-income people and people of color are more likely to live in areas with land cover characteristics conducive to urban heat islands. Additionally, research has identified a correlation between home values and tree cover, meaning that addressing urban heat islands carries implications for financial equity. Actions to reduce the heat island effect also offer mitigation co-benefits, as increased tree cover can store carbon dioxide, as well as provide shade that reduces energy consumption needed for cooling buildings.

Many cities in Contra Costa County contain areas with very little contiguous tree cover, including most of the cities in East and West County, along with significant parts of Martinez, Concord, Danville, and San Ramon. Areas with very high percentages of impervious surfaces exist in many of the same urban areas with little tree cover. Areas with a high percentage of impervious surfaces are concentrated in North Richmond, San Pablo, Richmond, and El Cerrito, and in some tracts in cities in Central and East County.

Climate Equity (CE)

Contra Costa County will address environmental factors leading to health disparities, promote safe and livable communities, and promote investments that improve neighborhood accessibility.

Ensuring that Contra Costa County's unincorporated communities are a welcoming and resilient home to diverse families, individuals, and businesses as the effects of climate change intensify around the world means ensuring that the County's climate action strategies are built on a foundation of justice and equity. Equity, justice, and the climate resilience they engender can take many forms across different sectors and include such strategies as supporting family-sustaining jobs in sustainable industries, providing equitably distributed green space, facilitating access to fresh and healthy food, and ensuring that all Contra Costa County departments and citizens are actively engaged in climate action planning. An important aspect of Climate Equity will be using culturally and linguistically appropriate methods. Climate action planning entails mobilizing the entire community to adopt a way of life and way of doing business that will not only weather the disruptions caused by climate change but will continue to thrive far into the future.

CE-1: Provide access to affordable, clean, safe, and healthy housing and jobs.

Strategy CE-1 aims to ensure that all residents live in clean, healthy homes and neighborhoods; have access to parks, open space, and fresh food; have easy access to safe and affordable mobility options; and are trained for and have access to living wage jobs. The County commits to implementing the 2024 CAAP strategies for equitable benefits to Impacted Communities, ensures every County department integrates climate issues and climate-related effects in services to residents, and meaningfully and continuously engages the communities most affected by climate change with developing and implementing appropriate solutions.

Strategy CE-1 Co-benefits:

Enhanced recreation opportunities

Greater community resilience

Improved community equity

Increased economic opportunities

Increased resilience to pests

Strategy CE-1 Actions:

- In partnership with community-based organizations, reverse community deterioration and blight and improve personal and property safety in neighborhoods throughout Contra Costa County.
- Ensure that new housing for households making less than the area median income and housing for other Impacted Communities are outside of hazard-prone areas, including for wildfires, landslides, floods, and sea level rise, or that they are hardened or make use of nature-based solutions to remain habitable to the greatest extent possible.
- In partnership with community-based organizations, secure funding to create a program to provide low-cost or free air conditioning and filtration, improved insulation, low-emitting materials, energy solar and storage systems, energy efficiency, and indoor ventilation in homes, emphasizing buildings that are home to Impacted Community members. (Supported by SC-A6.2 and SC-A6.3)
- Track development of local micro-grid battery storage policies and systems in other jurisdictions and identify potential opportunities for Contra Costa County.
- Encourage companies and entrepreneurs from local universities and national labs to create jobs in such industries as renewable energy, transportation technology, diverse forms of manufacturing, biotech/biomedical, and clean tech.
- In partnership with residents of Impacted Communities, affected workers, business/industry, environmental and environmental justice advocates, community colleges, workforce development and training entities, local government, and other involved agencies, support transition from highly polluting industries to a net-zero emission economy based on renewable and sustainable industries that provide living-wage jobs. (SC-P1.1)

- Provide support for State and federal programs that support family-sustaining jobs in sustainable industries, efforts to support organized labor, and living wage labor standards.
- Adopt an ordinance at least as stringent as the State's maximum idling law, and coordinate with CARB and law enforcement to achieve compliance. (HS-A1.5)

CE-3: Increase access to parks and open space.

All County residents have easy access to parks and open space under this strategy. The County has an easily accessible and integrated system of high-quality, safe, and well-maintained parks and trails for all residents of the unincorporated county, including Impacted Communities.

Strategy CE-3 Co-benefits:

- Enhanced recreation opportunities
- Greater community resilience
- Improved air quality
- Improved community equity
- Improved public health
- Increased economic opportunities
- Reduced disaster effects

Strategy CE-3 Actions:

- Establish a goal for all residents to live within a half mile of a park or other green space.
- Support land acquisition for new parks and open space areas and protect such lands through fee title acquisition or through deed restrictions like conservation easements.
- Continue to construct and develop opportunities for new trails.
- Support investment in existing park facilities, in partnership with regional agencies.
- Increase the tree canopy on public property, especially in Impacted Communities and areas with a high heat index, by prioritizing funding for new street tree planting and maintenance. (HS-P2.2)

El Cerrito playground.
Photo credit: Amalia Cunningham.

CE-4: Ensure residents have equitable, year-round access to affordable, local fresh food.

With this strategy in place, county residents will have increased access to local fresh food. The County facilitates the creation of more Certified Farmers' Markets, supports urban gardens, and ensures that healthy food is affordable and accessible to Impacted Communities and those in food desert areas.

Strategy CE-4 Co-benefits:

Improved community equity

Improved public health

Increased economic opportunities

Strategy CE-4 Actions:

- Support establishment of year-round Certified Farmers' Markets in all communities, prioritizing Impacted Communities.
- Work with community groups to establish and maintain urban gardens, particularly on vacant lots and park land in Impacted Communities. (Supported by SC-P5.3)
- Encourage major supermarkets to locate in Impacted Communities. (Supported by SC-P5.1 and SC-A5.3)
- Support co-operative grocery markets in Impacted Communities.

Little Sprouts Farm in Bay Point.

MEASURES AND ACTIONS TO INCREASE CARBON SEQUESTRATION

The measures and actions below describe actions that define the specific policies, programs, and steps the County and its partners could implement to assist in reaching the state and County's 2045 carbon neutrality goal and to increase the health of the county's lands and people.

MEASURE 1: Promote Climate Smart Agricultural Practices

Action 1.1: Pursue funding (for example, California Department of Food and Agriculture [CDFA] Climate Smart Agriculture programs) and implement a voluntary agricultural conservation incentive program to encourage more farmers and ranchers to adopt conservation practices that have the potential to contribute to climate mitigation and enhance resilience of agricultural operations.

Action 1.2: Partner with the Contra Costa RCD, Contra Costa County Farm Bureau, UC Cooperative Extension, NRCS, and other stakeholders to provide outreach and education to farmers and ranchers on conservation practices that contribute to climate mitigation and increase resilience, and facilitate incentives to adopt these practices.

Action 1.3: Provide technical assistance to farmers for developing grant applications that support healthy soil practices (e.g., and compost) such as the CDFA Healthy Soils Incentive Program.

Action 1.4: Promote the development of conservation easements on natural and working lands through information sharing on the County's website, strategic partnerships, supporting community engagement efforts, and pursue funding to establish easements.

Action 1.5: Assist farmers and rangeland managers in accessing voluntary carbon markets that pay for carbon sequestration practices. Partner with the Contra Costa Resource Conservation District to explore implementing a program to group rangelands together for more competitive grant applications, similar to the model used by the Cachuma Resource Conservation District.

Action 1.6: Promote incentives and grants (for example, CDFA Climate Smart Agriculture programs) to improve water, fuel, and energy efficiency in agricultural operations.

Action 1.7: Support programs that incentivize replacement of older, polluting farm equipment, for example the Funding Agricultural Replacement Measures for Emission Reductions Program.

Action 1.8: Develop a program to facilitate equipment sharing for the implementation of climate-smart land management practices for small farmers that seek to implement these practices but lack access to necessary equipment such as a no-till drill seeder, tractors, mowers, etc.

MEASURE 2: Promote Conservation, Habitat Restoration, and Sustainable Management of Natural and Working Lands

Action 2.1: Develop a comprehensive conservation plan to include portions of the County not represented in the East Contra Costa County Habitat Conservation Plan and other conservation efforts, to implement natural land conservation and habitat restoration projects. Create an equitable outreach and engagement campaign during plan development and implementation.

Action 2.2: Pursue funding to implement natural land conservation restoration projects.

Action 2.3: Increase the production of high-quality, low-contamination compost locally.

Action 2.4: Develop a program to facilitate compost application on burn scars, and applicable natural and working lands, including rangelands in the county.

Action 2.5: Develop and implement a plan for the conservation of sparsely vegetated lands, such as beaches and bare rocks, that includes educating local landholders about the importance of this land type and conservation easements for private landholders on this land type.

Action 2.6: Address policy barriers that prohibit or discourage the voluntary creation or restoration and management of habitats and ecosystems by coordinating with local, State, and federal agencies.

Action 2.7: Explore the creation/expansion of tax incentives to conserve agricultural lands.

Action 2.8: Implement the recommendations in the 2015 Contra Costa County Food System Analysis and Economic Strategy to protect agricultural areas at risk of development. Maintain and enforce the Urban Limit Line, encourage infill and transit oriented development, and adopt and implement policies, programs, and projects to reduce urban sprawl and avoid land conversion.

MEASURE 3: Improve Health of Grasslands, Shrublands, and Woodlands and Mitigate Wildfire Ignition Risk and Fuel Load in the Wildland Urban Interface to Reduce Risk of Wildfire Events and Resulting GHG Emissions

Action 3.1: Engage with the East Bay Regional Parks District, local fire districts, local Fire Safe Councils, RCD, CAL FIRE, local tribal groups, and other regional, local, and state agencies to conduct fuel treatments within their jurisdictions and along highway corridors, restoring ecosystem resilience and protecting communities through updates to the Community Wildfire Protection Plan.

Action 3.2: Continue community education programs to inform residents of the importance of clearing a defensible space around homes and resources available to residents. This may include tabling at community events, information resources on the County webpage, mailers, and social media.

Action 3.3: Continue to seek funding from CAL FIRE Wildfire Prevention Grants Program to conduct fuel reduction projects, particularly in the wild-land-urban interface.

Action 3.4: Implement shaded fuel breaks.

MEASURE 4: Protect the Urban Forest and Increase Urban Tree Cover

Action 4.1: Develop and adopt a County Street Tree Policy which provides guidelines for the replacement of existing trees, designates suitable trees as replacements, and enables the County to partner with community groups to seek grants to sustain and nurture the County's urban forest.

Action 4.2: Maintain and enforce the County Landscape Standards, which set specific standards for planting and maintaining trees in the County, and Tree Protection and Preservation Ordinance which provides for the protection of certain protected trees in unincorporated areas of the County and prohibits removing trees on private property without a special permit.

Action 4.3: Develop an Urban Tree Plan to actively plant and maintain trees in unincorporated communities. The plan should aim to preserve and grow the County's urban tree canopy cover, for example through establishing a shade tree requirement for new development, especially in impacted communities. Successful Urban Forest Tree Plan development and implementation will depend on community engagement.

Action 4.4: Plant new drought tolerant and fire-resistant trees at County facilities and parks following adoption of an Urban Tree Plan.

MEASURE 5: Facilitate Mechanisms to Value and Fund Local Carbon Sequestration Projects

Action 5.1: Identify costs and barriers associated with carbon offsets. Develop resources to provide assistance and increase participation from local land managers.

Action 5.2: Partner with the Contra Costa Resource Conservation District and other groups to develop and maintain an updated list of funding opportunities, resources, and application dates. Promote the California Natural Resources Agency (CNRA) Carbon Sequestration and Climate Resiliency Project Registry when it is launched in July of 2023.

Action 5.3: Establish a budget framework for investing in local carbon sequestration projects to offset the balance of communitywide emissions by 2045 in line with County targets set in the County Climate Action Plan and in support of State targets.

MOVING FORWARD

The goal is for Contra Costa County and its partners to use this study as a foundation to successfully fund and implement climate smart practices. Even though challenges exist such as needing improved equipment, regulatory barriers, cost of labor and maintenance, and land ownership, the county has a large network of individuals, community groups, non-profit organizations, and government agencies that are committed to maximizing the well-being of its residents and its natural and working lands. This strong network of dedicated individuals and the unprecedented amount of guidance and financial resources from the State puts Contra Costa in the ideal position for continued investment in maintaining resilient natural and working lands in the county.

Exploratory Co-Benefits Assessment – Derived from TerraCount and the Nature-Based Solutions (NBS) Explorer Tool

Climate Smart Activity	Total Co-Benefit Score	Human Wellbeing		Water Quality /Quantity								Biodiversity								
Climate Smart Activity by Category	Sum of Co-benefits Across All Categories (+) = 1, (-) = -1, (+/-) = 0	Air Quality	Scenic Value	Urban Water Conser-vation	Improved Surface Water Storage	Improved Surface and Ground-water Quality	Ground-water Recharge/ Storage Potential	Reduced Runoff/ Erosion	Improved Flow Regime	Flood Protection	Watershed Integrity	Terrestrial Connect-ivity	Natural Habitat Area	Priority Conservat-ion Areas	Terrestrial Habitat Value	Increased Native Animal Species	Increased Native Plant Species	Natural Pest Control	Support for Local Pollinators	Aquatic Bio-diversity
Natural Lands																				
Restoration of Native Grasses[1]	11					(+)	(+)	(+)	(+)	(+)		(+)	(+)		(+)	(+)	(+)		(+)	
Oak Woodland Restoration[1]	5	(+)				(+)					(+)		(+)	(+)	(+/-)					
Riparian Restoration[1]	8	(+)	(+)	(-)		(+)					(+)	(+)	(+)	(+)	(+/-)					(+)
Compost Application[1]	10	(-)			(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Urban Lands																				
Urban Forestry[1]	6	(+)	(+)								(+)	(+)	(+)		(+)					
Agricultural Lands																				
Row Crops																				
Cover Crops[1]	9	(+)	(+)			(+)						(+)			(+)	(+)	(+)	(+)	(+)	
Mulching[1 2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Compost Application [1 2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Hedgerow planting[1 2]	18	(+)	(+)		(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
Windbreak Establishment[2]	8	(+)	(+)									(+)			(+)	(+)	(+)	(+)	(+)	
Riparian Forest Buffer[1 2]	12	(+)	(+)	(-)		(+)					(+)	(+)	(+)	(+)	(+/-)	(+)	(+)	(+)	(+)	(+)
Riparian Herbaceous Cover[1 2]	12	(+)	(+)	(-)		(+)					(+)	(+)	(+)	(+)	(+/-)	(+)	(+)	(+)	(+)	(+)
Field Border[2]	8	(+)	(+)									(+)			(+)	(+)	(+)	(+)	(+)	
Alley Cropping[2]	8	(+)	(+)									(+)			(+)	(+)	(+)	(+)	(+)	
Conservation Crop Rotation[2]	8	(+)	(+)									(+)			(+)	(+)	(+)	(+)	(+)	
Residue Management- Reduced Till[2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Residue Management- No Till[2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Orchards and Vineyards																				
Cover Crops[1 2]	9	(+)	(+)			(+)						(+)			(+)	(+)	(+)	(+)	(+)	
Mulching[1 2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Compost Application[1 2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Hedgerow planting2	18	(+)	(+)		(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
Windbreak Establishment[2]	8	(+)	(+)									(+)			(+)	(+)	(+)	(+)	(+)	
Vineyard Only																				
Residue Management- Reduced Till[2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Residue Management- No Till[2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Orchard Only																				
Residue Management- Reduced Till[2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Residue Management- No Till[2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Whole Orchard Recycling**	0																			
Urban Farms																				
Cover Crops[1 2]	9	(+)	(+)			(+)						(+)			(+)	(+)	(+)	(+)	(+)	
Mulching[2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Compost Application[1 2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Hedgerow planting[1 2]	18	(+)	(+)		(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
Windbreak Establishment[1]	8	(+)	(+)									(+)			(+)	(+)	(+)	(+)	(+)	
Field Border[2]	8	(+)	(+)									(+)			(+)	(+)	(+)	(+)	(+)	
Alley Cropping[2]	8	(+)	(+)									(+)			(+)	(+)	(+)	(+)	(+)	
Conservation Crop Rotation[2]	8	(+)	(+)									(+)			(+)	(+)	(+)	(+)	(+)	

TOC

Climate Smart Activity	Total Co-Benefit Score	Human Wellbeing		Water Quality /Quantity								Biodiversity								
Climate Smart Activity by Category	Sum of Co-benefits Across All Categories (+) = 1, (-) = -1, (+/-) = 0	Air Quality	Scenic Value	Urban Water Conser-vation	Improved Surface Water Storage	Improved Surface and Ground-water Quality	Ground-water Recharge/ Storage Potential	Reduced Runoff/ Erosion	Improved Flow Regime	Flood Protection	Watershed Integrity	Terrestrial Connect-ivity	Natural Habitat Area	Priority Conservat-ion Areas	Terrestrial Habitat Value	Increased Native Animal Species	Increased Native Plant Species	Natural Pest Control	Support for Local Pollinators	Aquatic Bio-diversity
Residue Management- Reduced Till[2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Residue Management- No Till[2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Rangeland and Pasture																				
Compost Application to Rangelands[1 2]	10				(+)	(+)	(+)	(+)	(+)	(+)		(+)				(+)	(+)		(+)	
Prescribed Grazing (Pasture)[2]	10				(+)	(+)	(+)	(+)		(+)		(+)			(+)	(+)	(+)		(+)	
Prescribed Grazing (Rangelands)[2]	10				(+)	(+)	(+)	(+)		(+)		(+)			(+)	(+)	(+)		(+)	
Native Oak Restoration/ Silvopasture[1 2]	13	(+)	(+)		(+)	(+)	(+)	(+)		(+)	(+)	(+)			(+)	(+)	(+)		(+)	
Riparian Restoration[1 2]	11	(+)	(+)	(-)							(+)	(+)	(+)	(+)	(+/-)	(+)	(+)	(+)	(+)	(+)
Range Planting[1]	8	(+)	(+)									(+)			(+)	(+)	(+)	(+)	(+)	

[1] Co-benefits derived from TerraCount

[2] Co-benefits derived from Nature-Based Solutions (NBS) Explorer Tool

**No co-benefits data was found in either source for this activity, row left blank for consistency of methodology; however there are co-benefits recognized in the literature for this activity.