Organic Practices and Climate-Smart Agriculture:
How Organic Mitigates Climate Change – Crosswalk and Resources
Prepared by the USDA Agricultural Marketing Service (AMS) National Organic Program (NOP)

Climate-smart agriculture and forestry (CSAF) is an integrated approach that enables farmers, ranchers, and forest landowners to respond to climate change by reducing or removing Greenhouse Gas (GHG) emissions (mitigation) and adapting and building resilience (adaptation), while sustainably increasing agricultural productivity and incomes. The National Organic Program (NOP) has created this document to highlight the linkage between Organic Production and CSAF mitigation activities that have been shown to sequester carbon and/or reduce greenhouse gas emissions. For the purpose of this table, practices are defined as the USDA National Resources Conservation Service (NRCS) conservation practices on the Climate-Smart Agriculture and Forestry Mitigation Activities List for FY2023. These practices are also cited in USDA's Partnerships for Climate-Smart Commodities announcement as criteria for highly competitive projects that provide climate mitigation benefits.

These practices are eligible for financial support through NRCS conservation programs, including: Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), Regional Conservation Partnership Program (RCPP), Agricultural Conservation Easement Program (ACEP), Agricultural Management Assistance Program (AMA), Conservation Innovation Grants (CIG), On-Farm Conservation Innovation Trials (On-Farm Trials), and Conservation Technical Assistance (CTA). Additional opportunities may also be available via partners through the Partnerships for Climate-Smart Commodities and the Organic Transition Initiative. More information is available at www.farmers.gov/climate-smart.

Topic	Organic Practices included in the USDA Organic Regulations (7 CFR Part 205)	Climate Change Mitigation Outcome		NRCS Climate-Smart Mitigation Practices
		Carbon Sequestration	Reduction in Greenhouse Gas (GHG) Emissions	
Soil Health	Organic operations use practices that **maintain or improve soil quality**, including the physical, chemical, and biological condition of soil. (§205.200; §205.203(a)) Organic operations use management practices and **natural soil amendments such as manure and compost** to increase soil health and manage crop nutrients. (§205.200; §205.203(b)-(c)) Organic operations **do not use synthetic nitrogen fertilizer** or	Conserving and building soil locks carbon in the soil so it is not released into the atmosphere. Adding organic matter to the soil via multiple natural amendments (composts, manures, and vermicomposts) can further increase soil organic matter content,[1] allowing the soil to sequester more carbon.	The production of synthetic nitrogen fertilizers results in GHG emissions (from burning fossil fuels). By prohibiting these fertilizers, organic production reduces the demand for synthetic nitrogen fertilizers, thereby reducing GHG emissions.[2] Replacing synthetic nitrogen fertilizers with properly applied and managed organic fertilizers can significantly **reduce the**	**Nutrient Management** (590) practice improves nitrogen efficiency through careful consideration of how much, when, and where to apply nutrients. **Animal manures, composts, and other organic materials** can play a critical role in improving nitrogen efficiency, when applicable.

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	most synthetic pesticides, organic livestock cannot consume feed grown with these prohibited inputs. (§205.203(e)(1); §205.206(e))		**carbon and reactive nitrogen footprint**[3] and **increase energy efficiency** (per area basis)[4] of the farming system.	
	Organic operations implement **crop rotations** (including **cover crops**, green manure crops, and catch crops) and **tillage practices** to manage crop nutrients and soil fertility, maintain or improve soil organic matter content, manage deficient or excess nutrients, and prevent erosion. (§205.203(a)-(b); §205.205; §205.206(a))	Crop rotations, cover crops, and conservation tillage can improve soil structure and increase soil organic matter, which in turn increases carbon sequestration.[5] Land planted with cover crops absorbs more carbon from the air compared to soil left bare between cash crops, as the plants used as cover crops absorb carbon dioxide through photosynthesis.[6] Conservation/reduced tillage practices minimize soil disturbance and retain more residue on the soil surface when compared to conventional full-inversion tillage. Reduced tillage also means that less bare soil is exposed to the air, reducing oxidation and loss of CO_2 from soil to the atmosphere.[7]	Cover crops prevent erosion by keeping soil in place, which in turn reduces fertilizer runoff and leaching that could emit nitrous oxide (a GHG).[8] Conventional no-till systems rely on chemical herbicides (which emit GHG to manufacture) to control weeds. Organic systems may/often use shallow, non-inversion tillage instead of chemical herbicides, thereby reducing GHG emissions by avoiding chemical herbicides.[9]	Conservation **Crop Rotation** (328) and **Cover Crop** (340) practices are applied for purposes such as maintaining or increasing soil health and organic matter content. Reduced Till (345) practices (including **conservation tillage**) and No Till (329) practices (including in-row **strip tillage**) manage crop and weed residue with limited soil-disturbing activities to reduce soil carbon release.

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	Organic livestock operations provide **outdoor access** and manage **pasture** in a manner that **reduces contamination of soil** and **controls erosion.** Operations ensure sufficient quality and quantity for ruminants to graze at least 120 days and receive at least 30% dry matter intake from pasture throughout the grazing season. (§205.237; §205.240(a)-(c)); (§205.239(e))	Rotational grazing systems and appropriate stocking density can strengthen soil health to foster more plant growth than continuous or high-intensity grazing. More above-ground plant growth absorbs carbon through photosynthesis and results in increased below-ground plant growth, which stores carbon in plant roots.[10]	Allowing livestock to graze on pasture reduces the need to produce and transport feed, thereby reducing carbon emissions from transportation. Grazing animals spread manure across pasture, allowing the soil to absorb more manure in each spot. This practice emits less GHGs in comparison to liquid manure pits (used in concentrated animal feeding operations) that emit methane and nitrous oxide.[11]	Pasture and Hay Planting (512) and Range Planting (550) practices improve livestock **pasture and forage** quality while increasing perennial biomass and reducing erosion. Prescribed Grazing (528) practices manage livestock stocking rates and grazing periods to support livestock health while building soil health.

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Water Quality	Organic operations use practices that **maintain or improve water quality**, which includes managing nutrients in a way that **does not contaminate water** and using tillage practices that **minimize erosion**. (§205.200; §205.203(a), (c)) Organic livestock operations manage outdoor access areas, pasture, and manure to **minimize runoff** from animal waste into streams, lakes, and waterways, **prevent water contamination, protect natural wetlands and riparian areas**, and **control erosion**. (§205.237; §205.239(e); §205.240)	Biologically rich soils absorb and retain more water, which reduces runoff.[12] Reducing runoff (from farms into waterways) protects aquatic plants from harmful chemicals. More plants result in more carbon absorption through photosynthesis.[13] When soil stays in place, it stores carbon, as opposed to releasing carbon during erosion. [14]	Runoff from non-organic agricultural land can include synthetic fertilizers, which break down into nitrous oxide and emit GHGs. Organic practices reduce erosion and runoff which emit nitrous oxide (a potent GHG).[15]	Cover Crop (340), Field Border (386), Prescribed Grazing (528), Filter Strip (393), and Riparian Forest Buffer (391) practices help to protect surface and ground water from nutrient runoff, and they improve riparian and watershed function.
Biodiversity	Organic operations use practices that foster cycling of resources**, promote ecological balance**, **conserve biodiversity**, and maintain or improve **natural resources** of the operation including wetlands, woodlands, and wildlife. (§205.2; §205.200) Organic operations establish **buffer zones** to protect organic production areas from	Establishing buffer zones typically involves planting or conserving woodland or perennial plant habitats. Conserving trees, shrubs, and grasses results in more carbon sequestration by removing carbon from the atmosphere through photosynthesis.[16]	Enhancing biodiversity increases native/beneficial insect populations, which serve as natural predators to pests. This enhancement in turn reduces the need for manufactured pesticides and mechanical weed removal, which both emit GHGs.[17]	Numerous conservation practices are identified generally for the purposes of increasing **perennial biomass**, promoting **biodiversity**, protecting **natural resources**, providing wildlife and pollinator habitat, **protecting vulnerable soils**, and **preventing contamination** of

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	unintended contamination from adjoining land. Buffer zones may also provide a **habitat for wildlife** and beneficial **pest predators**. (§205.202) *Note: NOP 5020 includes an appendix of activities that may be used by certified operations to comply with natural resource conservation requirements.*			environmentally sensitive areas. Practices include: Conservation Cover (327); Contour Buffer Strips (332); Field Border (386); Filter Strips (393); Grassed Waterways (412); Mulching (484); Strip Cropping (585); Vegetative Barriers (601); Herbaceous Wind Barriers (603); Alley Cropping (311); Windbreaks (380); Silvopasture (381); Riparian Cover (390); Hedgerows (422); Tree/Shrub Establishment (612); Wildlife Habitat (645).

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