

## Climate Friendly Farming: Glossary

### Key Unit Conversions

1 hectare = 2.47 acres

1 MT C = 3.67 MT CO<sub>2</sub>e

1 Tg = 1 million metric tons (MT); 1 Mg = 1 metric ton (MT)

### Frequently Used Abbreviations

AD – Anaerobic Digestion

ASCMW – Washington Agriculture Sector Carbon Market Work Group

C – Carbon

CFF – Climate Friendly Farming

CH<sub>4</sub> – methane

CO<sub>2</sub> – carbon dioxide

CO<sub>2</sub>e – Carbon Dioxide Equivalent

CSANR – Center for Sustaining Agriculture & Natural Resources (WSU)

CT – conventional tillage

GHG – greenhouse gases

MT – metric tons (also Mg, megagram)

MMT – million metric tons (also Tg, teragram)

N – nitrogen

N<sub>2</sub>O – nitrous oxide

NT – no tillage or No-till

RT – reduced tillage

WSU – Washington State University

USDA ARS (or just ARS) – United States Department of Agriculture Agricultural Research Service

## Terms

**Anaerobic Digestion:** A wastewater treatment approach that biologically converts complex organic material to biogas containing CH<sub>4</sub> under anaerobic conditions. The CH<sub>4</sub>-rich biogas that is produced is combustible and can be used to generate combined heat and power, or further refined for other energy and/or fuel products.

**Carbon Dioxide Equivalents:** CO<sub>2</sub>e is the unit used to make comparisons across all GHGs, and is the current international standard to express GHG emissions. Emissions of non-CO<sub>2</sub> gasses are translated to CO<sub>2</sub> equivalents using global warming potentials (the IPCC recommends using 100-year GWPs). To convert from C to CO<sub>2</sub>e, multiply by 44/12.

**Carbon Offset:** A term associated with mitigating carbon dioxide (CO<sub>2</sub>) emission in one location by implementing an emissions reduction or carbon sequestration project (or practice) in another location. A carbon offset is the net reduction in CO<sub>2</sub> emissions resulting from the avoidance of a ton of CO<sub>2</sub>.

**Carbon Sequestration:** The net process of storing atmospheric carbon in a carbon sink. For example, terrestrial sequestration could result when carbon fixed in trees through afforestation, or plants and soil root masses, as a result of improved management practices that result in a net increase of carbon in the sink. (For example, carbon fixed through photosynthesis exceeding carbon dioxide release through plant respiration).

**Co-Digestion:** The simultaneous digestion of a homogenous mixture of two or more substrates. The most common situation is when a major amount of a main basic substrate (for example, manure or sewage sludge) is mixed and digested together with minor amounts of a single, or a variety of, additional substrates such as food waste or the organic fraction of municipal solid waste (OFMSW). The expression co-digestion is applied independently to the ratio of the respective substrates used simultaneously.

**Conventional Tillage (CT):** Includes and refers to use of moldboard plow or full width inversion tillage

**Cumulative Probability Distribution:** A probability distribution that describes the proportion of all observations that are less than or equal to the upper limit of a specified value or range.

**Direct Seed:** Direct-seeded systems are defined by the Pacific Northwest Direct Seeding Association as “any method of planting and fertilizing done with no prior tillage to prepare the soil” and includes no-till, as well as one and two pass systems.

**Global Warming Potential:** A measure of how much a given mass of greenhouse gas is estimated to contribute to global warming, by comparing the warming of the gas in question to that of the same mass of CO<sub>2</sub>. (whose GWP is by convention equal

to 1). A GWP is calculated over a specific time interval, and we follow the IPCC recommendations, we calculate GWP using the contribution over 100 years, and use the most recent (2007) values unless otherwise noted. CO<sub>2</sub> equivalents of N<sub>2</sub>O and CH<sub>4</sub> are 298 and 25 times that of CO<sub>2</sub>, respectively

**Green House Gases:** Temperature-regulating gases that form a blanket around the earth that traps heat from the sun within the earth's atmosphere, keeping the planet warm and habitable. "Global warming," or climate change, can occur when the concentration of atmospheric GHGs increases. Common green house gases include carbon dioxide (CO<sub>2</sub>), Nitrous Oxide (N<sub>2</sub>O) Chlorofluorocarbons (CFCs), and methane (CH<sub>4</sub>). The global warming potential of each of these gases differ significantly based on their radiative forcing properties.

**No-Tillage:** Refers to use of no full width soil inversion

**Reduced Tillage:** Includes use of non-moldboard plow operations such as disking

**Substrate:** In an anaerobic digester, substrates refer to organic materials (in our case, normally food processing wastes) that are digested along with manure.