Spreadsheet notes

This spreadsheet was developed based on the values from the RothC and AMG climate models

Both models have used data from long-term field sites to test soil responses to a range of exogenous organic matter such as composts, biosolids and digestates. The model is based on results expected from organics application to disturbed soils. We also included a set of sequestration values for shorter term carbon sequestration. The values for this were derived from work done in CA and WA.

Type of material

Different types of material (compost, biosolids and digestate) will have different rates of C sequestration. Here you just need to specify the type of material and that will let you continue with the appropriate default factors for accumulation

Cumulative amount applied- studies have shown that as total organic matter increases in a disturbed soil, it will eventually come to an equilibrium state. Once in equilibrium, no additional carbon sequestration will occur. The amount of C needed to reach this state will vary based on soil, climate and end use. Here I have used approximate values for higher and lower C sequestration. If the site has had over 50 tons per acre applied, it is likely to be close to equilibrium and will have a lower rate of C sequestration

Climate

The RothC model included different factors for C storage based on climate. The model included Nordic, Temperate and Mediterranean. As the temperatures increased, the relative rate of sequestration decreased. Here I have also included an arid climate. To model sequestration for the arid climate, I decreased the sequestration rates proportionally from the Mediterranean climate.

C/N ratio of material

Different studies have suggested that the higher the nutrients in an amendment, the greater the fraction of added carbon that will remain in the soil. In the AMG and RothC models, amendments that were high in C also included nutrient addition. For this, I modeled higher rates of sequestration for the higher nutrient materials. This is based on the assumption that no additional fertilization will be added. If fertilizers will be used in addition to EOM, then it would be appropriate to pick the lower C:N ratio to estimate sequestration rate. Here we used a C:N ratio of 11:1, as has been done for CA policy.

Amount applied

Both the RothC and AMG models predict a certain amount of C storage based on the quantity of C added with the different amendments. Here I have averaged the sequestration rates from both models to come up with a sequestration rate based on the total C added with each amendment application. There is a category for sites where less than 50 tons/acre have been applied, 50- 100 tons per acre and greater than 100 tons per acre. This was done to reflect the likely different rates of sequestration as soil health improves.