

Cover Crops and Water Management

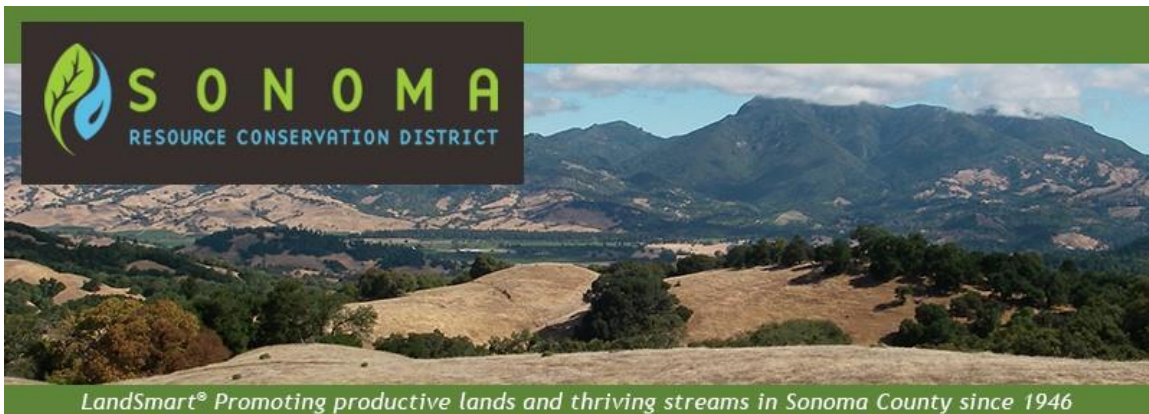
Cover crops are typically grown to protect soils from erosion, to build organic matter, and to supply nutrients; however, have you considered their impact on increasing water holding capacity in your soil, or conversely on the how they might compete for water with your crops? Agronomists and researchers are focusing more attention on these questions. When managed well, cover crops offer several benefits to conserve water and optimize its use.

Starting with the advantages, **cover crops can improve infiltration and water holding capacity in your soils.** They physically break up the soil. Roots bore through the soil, leaving new channels for water infiltration when they die and decompose. Plants with large taproots, like the daikon radish are particularly effective at breaking up compact soils, and increasing infiltration capacity.

Cover crops help to improve soil structure. Cover crop roots exude compounds that help aggregate soil. This increases porosity in the soil which is good for root growth, and ultimately creates more channels for water infiltration. Grasses with fibrous roots are especially good at doing this.

Cover crops increase organic matter in the soil. This is achieved through root development and decomposition, and the eventual incorporation of the above ground portion of plants into the soil. Additionally, increased soil biotic activity that occurs in the root zone of cover crops increases the level of organic matter in the soil. **There is a direct correlation between higher levels of organic matter and higher water holding capacity of the soil.** According to research published in the Journal of Soil and Water Conservation, as soil organic matter content increases from 0.5 to 3%, water holding capacity more than doubles for all soil texture groups. Water holding capacity continues to increase as soil organic matter content goes above 3%.

Cover crops protect soils. Cover crops help overcome the degenerative impacts of discing, tillage, and compaction from heavy farm equipment. Moreover, they improve soil structure and provide protection from the impacts of rain. Poor structure and high impact rain on bare soils can cause crusting, which creates a hard surface that is less pervious. Avoiding crusting increases infiltration while avoiding the negative impacts of



increased runoff such as erosion, deposition of fine sediment and other water quality concerns.

Cover crops can diminish evaporation when they are mowed and left on the ground.

This diminishes the impact of direct sunlight on soil and keeps the soil cooler below, which diminishes evaporation. It also suppresses weed growth, which avoids competition for water.

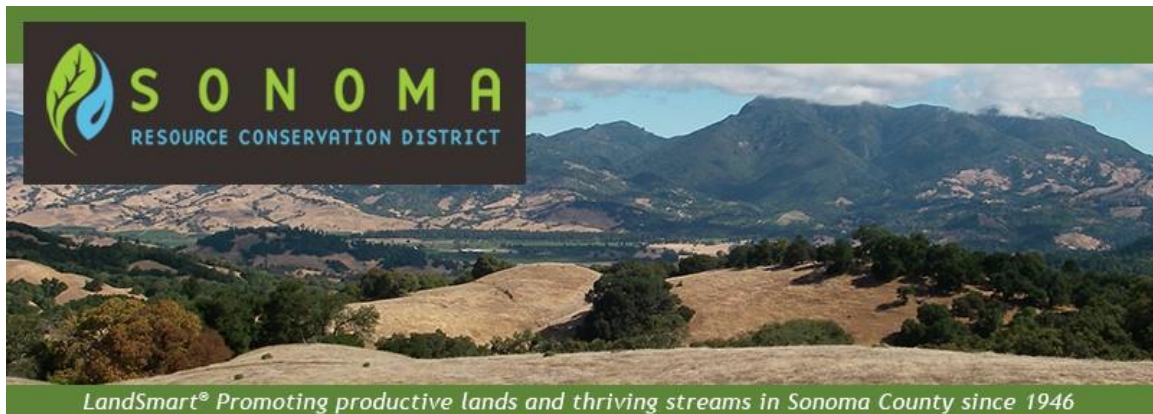
In wet areas cover crops can be used to manage areas with too much vigor or soil moisture. Plants like triticale can be planted that grow vigorously in spring, and transpire water out of the soil and into the atmosphere.

These water management benefits are in addition to conventionally recognized benefits including protecting soil from erosion, providing nutrients, outcompeting weeds, and improving crop growth with enhanced soil structure and increased organic matter.

Growers must also consider the potential issues of growing cover crops. **The main concern is that they can compete with crops for water and nutrients.** While north coast rain is usually sufficient to provide for crop and cover crop needs during winter and part of spring, there is a point in spring or summer where they need to be cut down to maintain higher moisture levels in the soil. Tom Hendrickson, owner of LeBallister's Seed in Santa Rosa points out, "There won't be significant competition for nutrients or water if you cut down the cover crop around March or April" This assumes you can work the ground at this time without creating erosion or compaction issues. Obviously the competition is more significant in drier areas and on drier years. The time to mow down cover crops depends on local and seasonal conditions.

Researchers have found mixed results on the impacts of cover crops on crop production. A conservative approach to address this is cutting down the cover earlier, to minimize competition with the crop. However some growers prefer a later date, so more organic matter can be incorporated into the soil, and water holding capacity can be increased.

Additionally, growers must consider what part of the soil they are trying to address. Most covers are shallow rooted. Thus their impacts may have more significance for a vegetable grower whose crops occupy the first foot, than a grape grower, who might have active roots 4-5' deep.



Cover crops can be seeded anytime from late July until the rains start. Growers tend to plant covers after harvest. But most seeds can handle some compaction from standard farming operations, and will sprout when the rains come. Early seeding can be a good option for grape growers in areas with a later harvest. It is generally best to seed by Halloween, so there is sufficient warmth in the soil, germination is stronger, and significant winter rains haven't come yet.

Growers need to choose between perennial and annual cover crops. Perennials tend to need some supplemental water in summer, though not everywhere in the north coast. It also depends which cover you are using. Most people plant annuals, but need to decide which ones are best for them and whether to use self-seeding mixes, or replant every year.

The key is to balance overarching goals and practical management needs. All locations and crops are different, and decisions must be met to address site specific needs. Work with your consultant or cover crop seed provider to customize a plan and determine which mix is best for your site. For more information, contact Keith Abeles at (707) 569-1448 xtn 112 or email kabeles@sonomarc.org.