



# Cover Crops

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## Definition:

Cover crops can be legumes or grasses, including cereals, planted or volunteered vegetation established prior to or following a harvested crop primarily for seasonal soil protection and nutrient recovery. Cover crops protect soil from erosion and recover/recycle phosphorus in the root zone. They are grown for one year or less.

## Purposes:

- To control erosion during periods when the harvested crop does not furnish adequate soil cover.
- To recover phosphorus and other nutrients in the root zone by plant uptake.
- To improve infiltration, thus reducing surface runoff from the soil.

## How Does This Practice Work?

Cover crops establish during the non-crop period, usually after the crop is harvested, but can be interseeded into a crop before harvest by aerial application or cultivation.

Cover crops reduce phosphorus transport by reducing soil erosion and runoff. Both wind and water ero-

sion move soil particles that have phosphorus attached. Sediment that reaches water bodies may release phosphorus into the water.

The cover crop vegetation recovers plant-available phosphorus in the soil and recycles it through the plant biomass for succeeding crops. The soil tilth also benefits from the increase of organic material added to the surface.

Growing vegetation promotes infiltration, and roots enhance percolation of water supplied to the soil. This reduces surface runoff. Runoff water can wash soluble phosphorus from the surface soil and crop residue and carry it off the field.

## Where This Practice Applies and Its Limitations:

Cover crops are suited for use in any cropping system where there is opportunity for ample vegetated development, canopy and roots before cold or dry weather to protect soil surface from detachment of soil particles by erosion or runoff. Good plant development is essential for uptake of available phosphorus.

Use caution in situations where cover crop vegetation

could deplete soil moisture prior to seeding the succeeding crop. Actively growing cover crops can pump water out of the soil by transpiration, thereby modifying soil moisture during wet periods.

Inadequate canopy cover or stem density of the vegetation will not provide sufficient soil protection or runoff reduction. A minimum of 50 percent canopy cover and 200 stems per square foot are required to produce the desired effects.

## Effectiveness:

With adequate vegetated soil cover, the erosion and runoff rates are greatly reduced. Reduction of erosion and runoff will correspondingly reduce phosphorus transport. Cover crops promote infiltration of precipitation into the soil profile, reducing runoff.

Cover crops' effectiveness in recycling phosphorus depends on the duration of growth and time of planting. The longer the plant grows, the more phosphorus accumulates in the biomass. Ranges of phosphorus in the above ground biomass, including harvested material and plant residue, is 10 to 30 pounds per acre.

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## **Cost of Establishing and Putting the Practice in Place:**

The cost of establishing cover crops includes seedbed preparation, seed and planting. Additional cost is connected with harvesting the vegetation or killing the vegetation for preparation of succeeding crops. The cost of harvesting may be offset by the value of the forage. Cost of establishment and maintenance for each cover crop ranges from \$4 to \$20 per acre.

## **Operation and Maintenance:**

A cover crop needs to be seeded to a density high enough to protect the soil surface by plant canopy and have sufficient stem density to retard runoff and promote infiltration. Timely planting is important to minimize the time interval between crop harvest and cover crop establishment. Weed control is required to prevent invasion of problem pests to the cropped area.

Ending the growth of a cover crop is critical because of the importance of moisture conservation for the succeeding crop. The timing of harvesting the cover for forage should be accomplished to both conserve soil moisture and produce a quality forage.

Termination of the cover crops is usually performed before seeding of the subsequent crop. This can be done by mowing, tillage, roller chopping, application of herbicides or relying on temperature extremes.

## **References:**

Local Cooperative Extension crop budgets can be referenced to determine local cost. USDA-NRCS and Extension Service technical references and standards (Cover Crop, code 340) are available at local county offices.

Hargrove, W. L. (ed.) 1991. *Cover Crops for Clean Water*. Soil and Water Conservation Society. Ankeny, IA. [www.swcs.org/publications.htm](http://www.swcs.org/publications.htm)

*Managing Cover Crops Profitably*. 2nd Edition. 1998. Sustainable Agriculture Network, Handbook Series, No. 3. USDA Sustainable Agriculture and Education Program. Burlington, VT. [www.sare.org](http://www.sare.org)

Power, J. F. (ed.). 1987. *The Role of Legumes in Conservation Tillage Systems*. Soil and Water Conservation Society. Ankeny, IA. [www.swcs.org/publications.htm](http://www.swcs.org/publications.htm)

## **For Further Information:**

Contact your local conservation district, USDA-NRCS or Cooperative Extension Service office. Cost-share may be available for seeding cover crops from the Consolidated Farm Service Agency (CFSA).