Economics and Soil Improving Methods Using Cover Crops

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The importance of healthy soils is evident to all farmers. Maintaining healthy soil conditions can be a great challenge, especially in sandy soils where organic matter is quickly lost. Additionally, tillage adds to the loss of organic matter and in most vegetable crops multiple tillage operations are needed to create a planting bed for crop establishment. Increasing organic matter levels in soil can greatly improve soil health.

One of the most efficient methods of increasing soil organic matter levels is to use on-farm inputs. There are very few farm operations in this day and age that produce livestock and crops for human consumption (i.e. vegetables). Therefore, on-farm manure inputs may not be readily available to vegetable farmers. In the absence of manure, one of the best ways to obtain organic amendments for soil is to "*grow it yourself"*. This means planting and maintaining high biomass producing cover crops and green manures. See Table 1 for information on cover crops, seeding rates, soil pH requirements, seeding depths, estimated costs, and planting dates.

Some of the obvious reasons for using cover crops are to reduce soil from wind erosion. Additionally, water erosion from heavy rains or over irrigation can remove precious topsoil from fields. In the Northeast some fields can loose up to 2 tons of topsoil per year from erosion. Another obvious reason for planting cover crops is to increase soil organic matter. Some not so obvious reasons for implementing cover crops into a rotation is to reduce fertilizer and pesticide runoff into surface waters. Nearby ponds, streams, and rivers used for irrigation can become easily contaminated from field runoff. By using cover crops this can be prevented. Also the planted cover crop can recycle the fertilizer left in a field by absorbing the nutrients during the growth and then releasing them when the cover crop is plowed down and decomposed. When cover crops are planted they also create an improved environment for beneficial microorganisms and insects. Some cover crops, like winter rye, can decrease weeds by giving off allelopathic chemicals that hinder weed seed germination. Additionally, cover crops can help reduce soil compaction, improve the soil structure, enhance percolation, and add aeration to the soil.

When choosing a cover crop to plant first investigate the purpose for this planting. If you would like to improve soil nitrogen choose legume crops. Those recommended in the Northeast include red clover, hairy vetch, berseem clover, and crimson clover. For building soil organic matter use annual ryegrass, winter rye, sweet clover, or sorghum-sudangrass hybrids. Cover crops that help reduce soil erosion best in rotations are winter rye, annual ryegrass, white clover, and cowpeas. If your aim is to loosen compacted subsoils you may want to try deeper rooted cover crops or those with large root systems, like sorghum-sudangrass hybrids, sweet clover, and alfalfa (if you intend on a longer rotation). Cover crops that combat weeds through natural plant inhibiting chemicals or competition include annual ryegrass, winter rye, oats, and buckwheat. Some cover crops have also been found to have soil disease suppression capabilities. Sorghum-sudangrass hybrids have been found to suppress some nematodes. However, one of the best results of planting cover crops is the organic matter buildup of your soil. If managed correctly, cover crops can significantly raise the organic matter levels of soil. Raising organic matter levels in mineral soils will show great improvement in soils and in crop health.