

Soil nutrient management for organic production

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Organic producers are faced with somewhat different challenges in maintaining their soil nutrient levels than are conventional producers. The new Montana State University Extension bulletin Soil Nutrient Management on Organic Grain Farms in Montana presents options for organic producers to maintain or build soil nutrient availability.

"This bulletin is based on data from studies done in Montana and the Northern Great Plains," said Clain Jones, Extension soil fertility specialist in the Department of Land Resources and Environmental Sciences (LRES) at MSU. Although the bulletin focuses on organic grain production, Jones hopes that all producers will find useful information on legumes, crop rotation, and nutrient inputs in the bulletin.

Nutrients removed at harvest must eventually be replaced or made more available from the soil by altering soil properties. However, since there is a finite amount of each nutrient in the soil, using crops or additives that extract more nutrients from the soil is a short term solution. Ultimately the soil nutrient pool will be depleted and no longer sustain high yields. Jones and Perry Miller, sustainable cropping systems professor in LRES at MSU, have observed reduced winter pea biomass and wheat grain protein on the organic rotation at MSU's study plots in the Gallatin Valley, most likely due to insufficient nutrients.

Producers often focus on increasing nitrogen availability because it generally controls crop yield and quality more than any other nutrient. Growing legume green manures is a key strategy to supply nitrogen to

the soil. In order to maximize [nitrogen fixation](#) of legumes, the soil needs adequate levels of phosphorus, potassium and sulfur, which are neither easy nor inexpensive to add in organic systems.

Crop rotation, [cover crops](#), grain legumes and green manures must be the foundation of soil fertility on organic farms. Proper crop rotations ensure efficient use of nutrients and water and help break pest cycles, while cover crops help retain resources on the site. Grain legumes and green manure are usually considered as a way to increase soil nitrogen. However a large portion of their benefit is the gradual increase in soil organic matter and improved soil structure and microbial activity. These are all discussed in the bulletin, as are intercropping and livestock integration with grain production as options to increase the sustainability of organic grain production.

Additional external inputs, such as manure or bone meal may be necessary to maintain soil fertility. Jones stressed that the producer must always be careful of the source and check with their certifying agent before using any product or practice on an organically managed field. If manure is available, it is likely your best source to supply all nutrients required by crops. However, the expense of hauling manure long distances and potential increase in weeds must be considered.

Inputs and practices intended to improve [soil](#) fertility should be assessed in terms of their ability to overcome existing yield limitations for a reasonable cost. The bulletin provides resources to help producers with this process.

More information: Online copies of this Extension bulletin can be downloaded from the Extension Publication link at landresources.montana.edu/soilfertility/

Provided by Montana State University

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