

Nutrient Balance Can Be Achieved Using Both Inorganic and Organic Sources

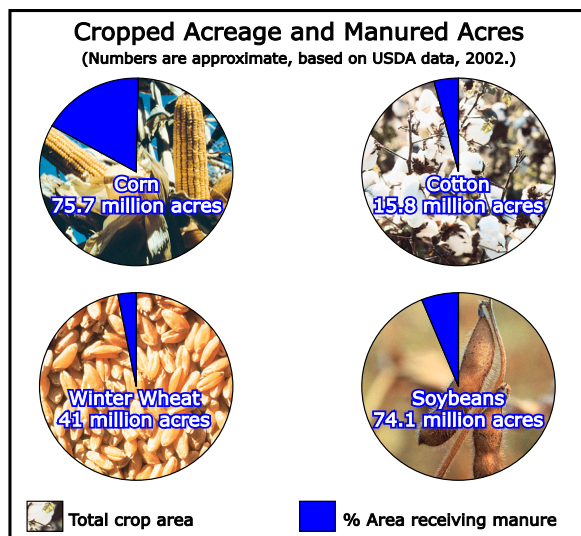
The impact of modern agriculture on the environment has been the subject of much discussion. Some challenge the sustainability of high yield crop production, particularly from an environmental standpoint. Some claim that any synthetic input—such as commercially produced mineral (inorganic) fertilizers—will eventually damage, if not destroy, the environment. The fact is that nutrient balance, using both inorganic and organic sources, goes hand-in-hand with high yield agriculture and environmental protection.

In crop production, commercially produced fertilizers are more manageable than organic sources. Their impact on both crop and environment can be controlled through proper selection of rates, sources, placement, and timing. Through careful management, it is possible to supply nutrients close to the optimum levels and time of crop needs for best economic and environmental efficiency. On the other hand, it is extremely difficult to provide balanced soil fertility requirements and plant nutrient demands solely through the use of animal manures and other organic sources such as biosolids.

Long-term use of manures often results in the buildup of soil phosphorus (P) because the manures contain nitrogen (N), potassium (K), and P levels disproportionate to crop needs and removal. That is, crops need more N and K than the manures contain, while not requiring all of their high levels of P. The end result can be detrimental to surface waters because of the loss of the excess P by erosion and runoff.

One of the difficulties of managing organic nutrient sources is keeping N supply and crop demand in balance. In order to meet season-long N requirements for crops, farmers must provide high rates of animal manures or other organic sources early in the season. The breakdown of those sources to release inorganic N—the only form the crop can take up and use—does not match crop growth patterns and demands. Thus, N might be in short supply at critical times during the growing season and in excess during those periods following crop harvest. That means yields can be limited, and excess N can remain in the soil as a potential pollutant to surface water or groundwater.

Using inorganic fertilizer sources, farmers can provide balanced nutrition necessary to achieve high crop yields while protecting the environment. Where organic nutrient sources are available—such as animal manures—they should be used because of their value in supplying nutrients and organic matter to the soil. However, for greatest efficiency and environmental protection, inorganic sources form the basis of nutrient management for many crop production systems. **EB**



A relatively low percentage of acres of major crops (corn, soybeans, winter wheat, cotton) in the U.S. are fertilized with livestock manure. The availability of livestock manures and other organic sources is not sufficient to replace inorganic (commercial) fertilizers.