ENVIRO-BRIEFS

No. 8

Crop Fertilization and Water Quality

It has been estimated that fertilization accounts for more than a third of all crop yield in North American agriculture. In other parts of the world, where farm land has been abused for centuries or where new land is brought into production and quickly mined of its nutrients, fertilization might contribute as much as 75% of total food production. Proper crop fertilization is essential to prevent massive global starvation. Yet, the most common perception among non-agriculturists is that fertilizer use damages the environment, specifically water quality…not that it helps feed the world's billions of people.

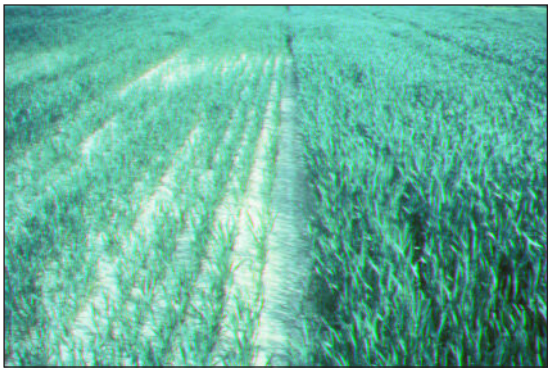
The truth is that high, efficiently produced crop yields, and environmental protection—including water quality, and balanced fertilization—go hand and hand. Consider some of the benefits of fertilizer nutrient use that is in balance with crop requirements. Proper nutrition helps to produce a healthy, fast growing crop that has a vigorous root system and establishes a dense canopy to protect the soil surface, resulting in:

- less runoff and erosion;
- increased water infiltration to supply crop needs and boost yield potential;
- more biomass left after crop harvest to help keep the soil stable and to contribute to organic matter levels.

By developing nutrient management plans and fertilizing according to soil tests, farmers help to assure that most of the fertilizer nutrients they apply are taken up by the crop being grown, not left in the soil for possible entry into nature's water system. Nitrogen (N) and phosphorus (P) are the only nutrients of concern with regards to potential water problems from fertilization. But, when they are used in balance with other essential nutrients such as potassium (K), and within systems utilizing best management practices, there is little danger to either surface water or groundwater.

In order to protect water quality, care should be taken to avoid over fertilization. However, significant danger to water quality is also associated with too little fertilization. When crops are produced without proper nutrition, their growth is less robust, and they offer little protection from the potential impacts of wind and water erosion. If the crop can't take up the nutrients it needs because of low soil fertility or improper fertilization, erosion—with the potential loss of soil P to surface water—is more common, as is N leaching into groundwater. Needless to say, farmers then produce lower yields per acre, they can feed fewer people, and their incomes suffer.

Crop production is a dynamic system. Because it is biological in nature and not contained in a controlled environment, there is always the potential for nutrient leakage from the system. Thus, fertilization is not fool proof. There are far too many variables for 100% control. Nevertheless, a well managed fertilization program is the best alternative to meeting the world's food needs and protecting our precious soil and water resources. EB



With proper fertilization (as shown in the plot at right), crops produce more yield while protecting soil and water resources.

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