

Nutrient Balance: Critical to Crop Production and Environmental Protection

People and crop plants are a lot alike in several ways, one in particular. They both need balanced nutrition for normal growth and good health. Unlike people (who require a variety of foods) crop plants need only 17 nutrients, some obtained from air and water, to grow normally – if those nutrients are supplied in the proper balance. When crops have balanced nutrition, an added bonus is increased environmental protection.

Nutrient balance results in increased nutrient use efficiency. For example, research has shown that when nitrogen (N) is balanced with phosphorus (P), potassium (K), and other essential nutrients, crop yields increase and so does N use efficiency. That means more N is used by the crop and less is left in the soil as a potential pollutant. In a 40-year irrigated corn study in Kansas, balancing N with P resulted in average yield increases of 46 bu/A per year while reducing nitrate-N (NO₃-N) in the upper 10 ft. of soil by two-thirds when compared to N only.

Another benefit of balanced nutrient use is increased water use efficiency by crops. Water use efficiency can be increased by as much as 200% and more simply by supplying essential nutrients in the proper balance. In many areas of North America, there is increasing competition between urban areas and agriculture for limited surfacewater and groundwater supplies. Thus, anything agriculture can do to increase water use efficiency is obviously a good thing for both the urban population and farmers. People must have clean water to drink, but they must also have food to eat.

By growing more crops per acre through proper nutrient balance, farmers help to alleviate the detrimental effects of global warming. Increased crop biomass results in more carbon (C) being stored in the soil, thus slowing atmospheric enrichment of the greenhouse gas carbon dioxide (CO₂). Healthy, vigorous crops—the result of balanced nutrition—produce a quicker canopy to protect the soil against rainfall and wind, thus reducing the potential for erosion. Extra surface residue left behind after the harvest of high yielding crops further protects against erosion and runoff.

Well-fertilized crops produce more yield per acre, releasing fragile lands for other important—and safer—uses such as wildlife habitat and recreational areas. This is a critical point to consider since arable land per person in the world is shrinking, and in some countries, land unfit for sustained agricultural production continues to be farmed.

In order to maintain a balance between adequate food production and environmental protection over the long term, crop yields must continue to increase. Science leaves no doubt that such increases will be possible only through the proper use of plant nutrition and other best management practices. **EB**

Properly balanced crop nutrition results in higher, more efficient yields, while also safeguarding the environment.

