

studies boosted this to 19% increased nutrient uptake when fertilizer is strategically placed in the soil.

The trend for specific placement techniques was subsurface shallow band (15% increased nutrient content), followed by subsurface deep band (14%). Placement of ammonium (or urea) together with soluble P resulted in a consistent increase in nutrient uptake compared with either N or P alone.

Subsurface placement of fertilizers can result in increased yields, more nutrient uptake, and a higher nutrient concentration in plant tissues compared with broadcast application. This is likely due to:

1. The occurrence of high nutrient concentrations in close proximity to plant roots
2. Favorable chemical and biological changes in the rhizosphere
3. Stimulation of root growth in the vicinity of ammonium and soluble phosphate
4. Reduced nutrient loss to the environment
5. Deep placement (>10 cm) may provide nutrient access during times of drought stress

Subsurface placement of fertilizer can be a useful tool to improve farm productivity, but it must be considered for each field, crop, and nutrient. Additionally, subsurface fertilizer placement techniques require additional labor and energy, compared with surface application. The growing trend towards greater farm size can make it challenging to fertilize large fields in a timely manner when a slower application technique is used. However, the multiple advantages of this technique should be carefully considered as a part of the 4R Nutrient Stewardship strategy.

Acknowledgment

This article is a summary of the full article published by Peteh Mehdi Nkebiwe, Markus Weinmann, Asher Bar-Tal, and Torsten Müller. 2016. Fertilizer placement to improve crop nutrient acquisition and yield: A review and meta-analysis. *Field Crops Research* 196:389-401. [DOI](#)

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