

# Trade-offs in Agriculture and Nutrition

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## Introduction

Presumably since the dawn of agriculture, humans have measured their farming success mainly by the size of their crops. Many environmental and genetic methods can increase crop yields, including irrigation, fertilization, weed and pest control, choice of cultivated variety, and selective breeding. These methods applied to grains culminated in the “Green Revolution” of the 1960s and '70s greatly increasing yields of wheat, rice, and maize.

Unfortunately, in recent decades we have learned that increased yields may reduce concentrations of some nutrients. We should not assume that plant composition remains constant as we increase yield. A 1981 review in *Advances in Agronomy* discussed the widely cited “*dilution effect*,” in which yield-enhancing methods like fertilization and irrigation may decrease nutrient concentrations (an environmental dilution effect). Recently, evidence has emerged that genetically based increases in yield may have the same result (a genetic dilution effect). Either way, modern crops that grow larger and faster are not necessarily able to acquire nutrients at the same, faster rate, whether by synthesis or by acquisition from the soil.

Thus, there can be trade-offs between yield and nutrient concentration.

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