Prices of nitrogen and phosphorous fertilizer spiked between 2008 and 2012. A partial equilibrium model of global nitrogen, phosphorus, and potassium fertilizer markets is constructed that is capable of producing a baseline of economic variables against which the impacts of various alternative scenarios can be evaluated. A 10% tax on farm-level nitrogen fertilizer in the United States would decrease domestic use in 2013 by 2.2%, suggesting that a very high tax might be required to obtain large reductions in nitrogen fertilizer use. A 10% increase to North American natural gas prices resulted in a long-run decrease in U.S. nitrogen fertilizer production of 2.4%, and long-run decreases in production in foreign markets of 0.1%. A 10% decrease in U.S. corn acreage was projected to reduce U.S. nitrogen, phosphorus, and potassium fertilizer use by 4.1%, 3%, and 2.5% in 2013, respectively, leading to moderate decreases in fertilizer prices and smaller reductions in domestic production.